Pesticides Management Plan

State of Idaho

Idaho Department of Health and Welfare
Bureau of Water Quality
Boise, Idaho
January 1988

STATE OF IDAHO
FOREST PRACTICES WATER QUALITY MANAGEMENT PLAN

This plan fulfills the requirements of Section 208 of the Clean Water Act for forest practices in the State of Idaho, and updates the plan originally approved in 1979.

This document was prepared by:

Stephen Bauer, Idaho Department of Health and Welfare, Division of Environment
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*Cover Photo: Hunt Creek Falls, tributary to Priest Lake. Photo by Mike A. Beckwith, Coeur d'Alene Field Office, IDHW-DOE.

Idaho Department of Health and Welfare
Division of Environment
Water Quality Bureau
Boise, Idaho

January 1988

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OFFICE OF THE GOVERNOR
STATE CAPITOL
BOISE

CECIL D. ANDRUS
GOVERNOR

February 11, 1988

Robie Russell
Regional Administrator
Region X, EPA
1200 Sixth Avenue
Seattle, WA 98101

Dear Robie:

I am pleased to forward to you the State of Idaho Forest Practices Water Quality Management Plan. The plan is the product of a cooperative effort by the Idaho Department of Health and Welfare, the Idaho Department of Lands, the U.S. Forest Service, and the Bureau of Land Management, and it revises the plan originally prepared in 1979. I certify that the plan is consistent with the state Water Quality Management Program as required by Sections 208 and 319 of the Clean Water Act and the Water Quality Planning and Management Regulations, 40 CFR 130, January 11, 1985.

I am confident that implementation of the plan will foster a cooperative effort among the agencies, concerned citizens, and forest industry in protecting the quality of Idaho's streams and lakes. I look forward to continued cooperation from the Environmental Protection Agency in this endeavor.

With best regards,

Sincerely,

Cecil D. Andrus

Cecil D. Andrus
Governor

CDA:gfl

enclosures

IDAHO DEPARTMENT OF LANDS
STATEHOUSE, BOISE, IDAHO 83720

STANLEY F. HAMILTON
DIRECTOR

BOARD OF LAND COMMISSIONERS
CECIL D. ANDRUS
Governor
PETE T. CENARRUSA
Secretary of State
JIM JONES
Attorney General
JOE R. WILLIAMS
State Auditor
JERRY L. EVANS
Sup't of Public Instruction

November 2, 1987

Kenneth Brooks, Director
Idaho Department of Health & Welfare
Division of Environment
Statehouse
Boise, Idaho 83720

Dear Mr. Brooks:

The Department of Lands has worked closely with your staff to revise the Idaho Forest Practices Water Quality Management Plan. The multi-agency responsibilities are well outlined so as to provide tracking of the efforts to meet our state responsibilities under the federal Clean Water Act.

As all parties to the plan work diligently to attain their respective goals for controlling nonpoint source pollution from forest practices activities, improved water quality will be realized. While some aspects of the plan call for fiscal or manpower expenditure beyond current levels, our agency supports the plan and will strive to meet its objectives.

Through the plan revision and our work with the nonpoint source team, a relationship has been created which I encourage and support as a means of implementing this plan.

Sincerely,

Stan Hamilton

STANLEY F. HAMILTON
Director

SFH:lr

United States Department of Agriculture | Forest Service | Region 1 | Federal Building
P.O. Box 7669
Missoula, MT 59807

Reply to: 2534

Date: SEP 29 1987

Kenneth Brooks, Director
Idaho Department of Health and Welfare
Division of Environment
Statehouse
Boise, ID 83720

Dear Mr. Brooks:

Over the past two years, we have participated in the revision of the Idaho Forest Practices Water Quality Management Plan. This Management Plan, from our perspective, is the implementation device for the Idaho Water Quality Standards. It reflects the current standards and describes our responsibility under state and federal statute for water quality protection and the goals and objectives which we will strive to meet in the future.

We believe this Management Plan has described a realistic and attainable program for controlling nonpoint source pollution from forested lands as required by Section 208 of the Clean Water Act. Our agency endorses and supports this program. We also appreciate the water quality leadership exerted by you and your staff.

We pledge the support and cooperation of this agency in the implementation of this Plan on National Forest System lands.

Sincerely,

for JAMES C. OVERBAY
Regional Forester

United States Department of Agriculture | Forest Service | Intermountain Region | 324 25th Street Ogden, UT 84401

Reply to: 2530

Date: SEP 29 1987

Mr. Kenneth Brooks, Director
Idaho Department of Health and Welfare
Division of Environment
Statehouse
Boise, ID 83720

Dear Mr. Brooks:

Over the past 2 years, we have participated in the revision of the Idaho Forest Practices Water Quality Management Plan. This Management Plan, from our perspective, is the implementation device for the Idaho Water Quality Standards. It reflects the current Standards and describes our responsibility under State and Federal statute for water quality protection and the goals and objectives which we will strive to meet in the future.

We believe this Management Plan has described a realistic and attainable program for controlling nonpoint source pollution from forested lands as required by Section 208 of the Clean Water Act. Our Agency endorses and supports this program. We also appreciate the water quality leadership exerted by you and your Staff.

We pledge the support and cooperation of this Agency in the implementation of this Plan on National Forest System lands.

Sincerely,

for J. S. TIXIER
Regional Forester

OCT 5 1987

(932)

Governor Cecil Andrus
State of Idaho
Statehouse Mail
Boise, ID 83720

Dear Governor Andrus:

We have participated in the revision of the Forest Practices Water Quality Management Plan. The Management Plan describes our existing programs, our responsibilities under state and federal statute for environmental protection, and the objectives which we will strive to meet in the future.

I believe the management plan describes a realistic and attainable program, with adequate fiscal support, for controlling pollution from forested lands as required by Section 208 of the Clean Water Act. Our agency endorses and supports this program. We look forward to establishing a memorandum of understanding regarding this plan and will work towards its implementation. Staff contacts in this office are Karl Gebhardt (334-1892) or Ervin Cowley (334-9516).

Sincerely,

DELMAR D. VAIL

Delmar D. Vail
State Director

I. INTRODUCTION

PLAN PURPOSE

The forest industry in Idaho is an important segment of the state economy which provides employment opportunities, material for construction and wood products. Likewise the land and water associated with forests represent an important part of the state's economy, and is a resource base which must be properly managed to insure their continued value and uses. The most critical concern is protection of fisheries and domestic water supplies which are dependent upon the high quality streams in the forested watersheds of Idaho. The Clean Water Act requires the State to develop a reasonable and effective program to control water pollution associated with nonpoint source activities. This plan is one of several plans which are prepared by the Division of Environment to meet the requirements of the Act.

Best management practices (BMPs) are the primary control mechanisms for nonpoint sources of pollution. This concept is the basis for the "feedback loop" recently (Feb. 1987) incorporated into the State Water Quality Standards. The feedback loop refers to the use of monitoring to determine if BMPs are effective in protecting beneficial uses of water. Changes are made to the BMPs when monitoring shows that beneficial uses such as fisheries or domestic water supplies have not been protected.

The purpose of this plan is to provide the mechanism by which the feedback loop will be implemented for forest practice activities. The plan identifies the agencies, regulations, and programs for forest practices which are needed to protect streams and lakes for beneficial uses. Goals and objectives are defined for each program area. The plan identifies the existing program, the responsible agency, any needed changes, and the projected resources needed to meet the program objectives. This plan specifies the responsibilities and authorities of the Designated Management Agencies for state, private, and federal lands. Methods for evaluating the program have also been identified.

LEGISLATIVE AUTHORITY

The Federal Clean Water Act as amended in 1972 (PL 92-500), 1977 (PL 95-217), and in 1987 (PL 92-117) was intended by Congress to provide a means to protect and restore the quality of the water resources of the nation and to maintain their beneficial uses. The Clean Water Act recognized the need for differences in control strategies for nonpoint sources compared to point sources. Point sources are pollution sources which discharge to a waterway by way of a pipe or other discrete conveyance. The Clean Water Act established a number of specific programs for the control of point sources, and many of these programs have been successful in decreasing pollution from point sources in Idaho. Nonpoint sources of pollution are those which reach the stream from a diffuse source rather than discharged from a pipe. Nonpoint source activities usually involve disturbance of the soil surface, increasing the rate of erosion. Pollution results from the transport of sediment and associated pollutants into the waterway.

The difference between point source and nonpoint source pollution for forestry is described in 40 CFR 122.27:

> Silvicultural nonpoint source pollution includes nursery operations, site preparation, reforestation and subsequent cultural treatment, thinning, prescribed burning, pest and fire control, harvesting operations, surface drainage or road construction from which there is natural runoff.
>
> Silvicultural point source means any discernible, confined and discrete conveyance related to rock crushing, gravel washing, log sorting or log storage facilities which are operated in connection with silvicultural operations. Log sorting and log storage means facilities whose discharges result from the holding of unprocessed wood ... in self contained bodies of water or where water is applied intentionally to the wood.

The nature of nonpoint source activities requires a different approach to pollution control than through a national regulatory program as established for point sources. For this reason an areawide planning program was authorized under Section 208 of the Clean Water Act to encourage development of State and local control strategies for nonpoint sources.

With regard to forest practices, Section 208 (b)(2)(F) requires that the plan include "a process to (i) identify ... silviculturally related sources of pollution ..., and (ii) set forth procedures and methods (including land use requirements) to control to the extent feasible such sources." The culmination of the 208 planning process is to be a water quality management plan. The primary objective of the plan is to develop the necessary programs to achieve the goal of the Clean Water Act" ... that wherever attainable, an interim goal of water quality which provides for protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved" (fishable-swimmable waters). Other requirements for water quality planning and management are detailed in the Code of Federal Regulations, Chapter 40, Parts 35 and 130, Vol. 50, No. 8, Jan. 11, 1985.

SECTION 208 PLANNING PROCESS

The Forest Practices Water Quality Management Plan was certified by Governor John V. Evans and approved by the Environmental Protection Agency (EPA) in 1979 as the 208 plan for silvicultural activities. The plan was developed under joint project administration of Idaho Department of Health and Welfare-Division of Environment (IDHW) and Idaho Department of Lands (IDL). The technical work was contracted to the College of Forestry, University of Idaho. The University organized an interdisciplinary team composed of professionals with expertise in forest resources, aquatic biology, forest economics, forest engineering, forest hydrology, forest soils, and forest policy and administration. The interdisciplinary team utilized field tours and literature reviews to determine the adequacy of the Idaho Forest Practices Act, Rules and Regulations as Best Management Practices (BMPs) for silvicultural practices. Outputs of the University were reviewed by the 208 Forest Practices Technical Advisory Committee which represented involved agencies, industries, conservation and other interest groups. Additional oversight of the planning project was provided by the Silviculture Subcommittee of the State 208 Policy Advisory Committee.

The 1979 plan identified the Idaho Forest Practices Act, Rules and Regulations as the BMPs for silviculture if changes recommended by the Forest Practices Technical Advisory Committee were incorporated into the Rules and Regulations. Idaho Department of Lands was identified as the Designated Management Agency on state and private lands. United States Forest Service (USFS) and Bureau of Land Management (BLM) were identified as the Designated Management Agency for the plan on federal lands under their jurisdiction.

The 1979 plan needs to be revised and updated based on the experiences in implementing the plan. There was no provision in the Clean Water Act to provide funding for implementation of plans developed under Section 208. States and local governments were expected to fund implementation of the plans. The State of Idaho was unable to fully implement the 1979 plan due to inadequate funding for essential programs.

WATER QUALITY/FOREST PRACTICES ISSUE

The interpretation of the Idaho Water Quality Standards in relation to forest practices, especially on National Forests, has come under scrutiny in Idaho since the management plan was completed in 1979. In 1982 the USFS petitioned IDHW to change the Water Quality Standards relating to injury of protected uses. The USFS felt that strict interpretation of this regulation would prohibit timber harvest opportunities in National Forests. The USFS's request was made in response to unfavorable comments by IDHW regarding an environmental assessment for a proposed timber sale. The comments indicated that the estimated impact of 20 percent reduction in fisheries potential for that particular proposal would constitute

a violation of the Water Quality Standards by injuring a designated protected use. Additional petitions were submitted, public hearings were held, and the Health and Welfare Board adopted a compromise position. The Water Quality Standards were changed in 1983 to clarify the role of BMPs in controlling nonpoint sources of pollution.

The Health and Welfare Board also directed establishment of an interdisciplinary Task Force to assess whether BMPs were adequate in protecting water quality. The Silviculture Nonpoint Source Task Force was composed of representatives from the Idaho Department of Health and Welfare-Division of Environment, the Idaho Department of Lands, the Idaho Department of Fish and Game, the Idaho Conservation League, the American Fisheries Society, the Idaho Forest Industries Council, and the U. S. Forest Service. The Task Force made on-site evaluations of silvicultural operations conducted on federal, state, and private lands. The evaluations included a short site visitation and visual analysis of stream quality. A report presenting a consensus of all participants on the Task Force was published in March 1985.

In summary, the Task Force found that silvicultural BMPs were adequate to protect water quality on low or moderate hazard land types. The report pointed out, however, that the potential for major water quality impacts exists on high hazard land types, or where multiple activities are occurring in a drainage, even with the use of BMPs. The Task Force also found that compliance with of the Forest Practices Act was in most cases more than adequate on National Forest system lands, but was insufficient on state and private lands to ensure water quality protection. The Task Force concluded that the 1983 revisions to the Water Quality Standards were consistent with the requirements of the Federal Clean Water Act, and recommended that no further amendments be made to the Standards at that time.

Under requirements of the National Forest Management Act the National Forests in Idaho developed comprehensive Forest Plans to describe future forest management. The majority of the draft plans were released for public review and comment during 1985. The IDHW provided comments on these documents to the National Forests in regard to meeting the intent and policy of the State Water Quality Standards. The Idaho Forest Industry Council took exception to these comments and submitted proposals to the 1986 Idaho Legislature to modify the definition of serious injury in the Idaho Water Quality Standards. This legislation (HB 711) passed both the House and the Senate, but was vetoed by Governor John V. Evans. In his veto message, the Governor directed IDHW and IDL to establish an interagency work group to resolve the interpretation of the serious injury definition in the Water Quality Standards. The interagency team recommended changes to the Water Quality Standards that were subsequently adopted by the Health and Welfare Board in February, 1987. The standards refer to a "feedback loop" (See page 47) in which monitoring provides the basis for changing the best management practices.

SUMMARY OF RESPONSIBILITIES OF IMPLEMENTING AGENCIES

Responsibilities and authorities under this plan are divided among land management agencies and the water quality agencies. Agency responsibilities are described in further detail in Chapter 3 and Appendix B and C.

IDAHO DEPARTMENT OF HEALTH AND WELFARE

The Idaho Department of Health and Welfare-Division of Environment is responsible for developing and implementing water pollution control programs under state and federal law. The Department is the designated management agency for all sections of the Clean Water Act that apply to nonpoint source pollution control. IDHW is responsible for statewide planning under Section 208 of the Clean Water Act including development of a plan for silvicultural nonpoint sources. Control of pollution from forest practices occurs through implementation of this plan, development of interagency agreements, revisions of water quality standards, and identification of best management practices.

IDAHO DEPARTMENT OF LANDS

The Idaho Department of Lands is responsible for administration of the Forest Practices Act and the Rules and Regulations pertaining to forest practices on state and private lands (See Appendix B). Idaho Department of Lands is the designated 208 management agency for state and private lands.

UNITED STATES FOREST SERVICE

The USFS is responsible for implementation of best management practices on National Forest lands and compliance with State Water Quality Standards. The USFS is the designated water quality management agency for National Forest lands pursuant to Section 208 of the Clean Water Act. Administration of the National Forests is mandated by a number of federal laws and executive orders (See Appendix C) which require protection of water quality and management of multiple uses of the forest in addition to the Clean Water Act.

UNITED STATES BUREAU OF LAND MANAGEMENT

Bureau of Land Management is a designated management agency and is, therefore, responsible for implementation of best management practices on forest lands under their jurisdiction. Administration of BLM lands is mandated by a number of federal laws and executive orders (See Appendix C) requiring protection of water quality and management of multiple uses of the public lands in addition to the Clean Water Act.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

The Environmental Protection Agency has oversight responsibilities for sections of the Clean Water Act which have been delegated to the State (IDHW). EPA must periodically review the management plan and its updates and determine if the plan should continue to be approved.

II. WATER QUALITY IMPACTS OF FOREST PRACTICES

WATER QUALITY AND THE FOREST ECOSYSTEM

INTRODUCTION

The major tasks in 208 planning are to (1) identify the impacts associated with nonpoint sources and the extent and severity of the problem, and (2) develop and implement to the extent feasible solutions to water quality problems. Information on silvicultural impacts is available from forest research programs, published literature, and available (but limited) water quality data and stream habitat assessment data.

In Idaho there has been no comprehensive statewide assessment of the existing condition of forest streams as affected by nonpoint sources. This has in part been due to the lack of standard quantitative monitoring methods. Recently there has been an effort by National Forests to collect quantitative stream sediment data as part of the forest planning process. However, this effort has not been comprehensive enough; basic inventory data collection needs to be continued on streams within National Forests. The scarcity of basic stream data is even more evident for streams on state and private lands. There is virtually no water quality data regarding the effect of forest practices on these lands. Information on state and private lands is based on studies of the effectiveness of BMPs such as the Silvicultural Nonpoint Source Task Force Report (Bauer 1985) which did not include any water quality data.

The extent and severity of the water quality condition of streams in forested areas on a statewide basis is, therefore, unknown. This plan should initiate activities to improve the water quality data base. Information in this chapter concerns the potential impacts and cause and effect relationships that are known. The following discussion is excerpted primarily from Geppart, et al, 1984, and Megahan 1980.

TYPES OF POLLUTANTS

There are two general types of pollutants associated with forest practices. The first set includes naturally occurring water constituents that change due to the disruption of the natural ecosystem by forest practices. This includes sediment, dissolved chemicals, and water temperature. It is difficult to distinguish natural sources of these pollutants from man-caused sources and forest practice related impacts from other nonpoint sources which may occur in the watershed.

The second set of parameters involve introduced chemicals such as pesticides and fertilizers. These can be detected by conventional water quality monitoring methods. There has been very little evidence in Idaho that a problem exists with these parameters. This conclusion is based on the limited use of these practices in forest management in Idaho.

CUMULATIVE EFFECTS

A concept that is receiving a great deal of attention is the cumulative impact of forest practices (and other nonpoint sources) on water quality. Cumulative impact is defined in Council for Environmental Quality regulations:

> Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.
> (40 CFR 1508.7).

The concept of cumulative impacts is especially important in regard to the effect of deposited sediment on fish habitat. Activities distributed over time and space in a drainage may contribute more sediment than can be flushed out of the stream during high flows which results in a build-up of sediment in the stream bottom. Cumulative impacts to a stream transcend ownership boundaries; this is particularly a concern for land managers in mixed ownership watersheds (checker board lands) where no single entity has control of nonpoint source activities. Federal agencies are required to consider long-term cumulative effects of their activities in the environmental analysis process under NEPA. There is no environmental analysis requirement for state and private lands.

The South Fork of the Salmon River (SFSR) in central Idaho is a documented example of cumulative impacts caused by forest practices. Nearly all of the SFSR basin lies within the Idaho "batholith", a granitic bedrock geology which typically produces course-textured soils and has a high natural rate of erosion. Historically the SFSR provided important spawning grounds for summer chinook salmon and steelhead. An extensive network of roads was built in the drainage to access mining claims and to harvest timber (Road building practices used prior to 1965 in the SFSR basin would not be considered BMPs today.). Disastrous storms in 1964 and 1965 resulted in widespread road failure and severe sedimentation. Fish habitat in 1966 reached an estimated low level of 20 percent of natural potential. A moratorium on activities was initiated in 1965. The moratorium was lifted in 1977 with adoption of the SFSR Unit Plan. The moratorium together with mitigative measures have allowed the SFSR to begin the recovery process. However, it is believed that sediment levels have stabilized below natural potential (at approximately 55 percent in 1985) and are no longer improving (Payette N.F. 1985).

FOREST ECOSYSTEM

Impacts on beneficial uses of water arise from the interaction of man's activities with natural features and processes of the forest ecosystem. These impacts are rarely a single activity-response relationship. The interactions and processes are complex and the relation between cause and effect is not easy to identify or quantify. Components of the forest ecosystem which are important to the discussion of water quality are briefly described below.

Forests as ecological systems are composed of living organisms (flora and fauna) interacting with their environment (air, land surface, water). Watershed boundaries provide logical units for consideration of management effects on water quality. Watersheds encompass the components of the forest ecosystem which influence stream quality. Management of water quality in a forest must consider all activities in a watershed - forest practices and other nonpoint sources in combination with natural processes.

Soils and parent geology are the foundation of the forest ecosystem. Soil properties which affect erosion processes in a watershed are of primary consideration. Erosion involves the detachment and transport of soil particles from place to place on the land surface. Running water is the principal erosion force in forested watersheds. In timberlands of the Pacific Northwest, sheetwash erosion, soil creep, mass-wasting, and debris flows occur in response to long-term weathering of rock and soil, the availability of water, the presence of topograhic relief, and biological activity. Erosion processes are active in different areas and at different rates, depending on such factors as the mechanical strength of materials, climatic conditions (especially storms), local geology, and vegetative cover.

The land surface and associated forest cover act as the collection system for precipitation. Forest practices affect both the quantity and quality of water. Precipitation reaching the forest floor contributes first to surface storage, that is water in the forest litter, ponded in soil depressions, or held in the snowpack. It then infiltrates the soil or runs off as overland flow. In the undisturbed watershed overland flow is minimal due to the vegetative cover. Water infiltrates, flows laterally, and eventually surfaces as streamflow or percolates deep into underlying formations to recharge groundwater.

Water retained as soil moisture enters the atmosphere through evapotranspiration. It is estimated that 60-80 percent of annual evapotranspiration in the forest is due to transpiration from plant life. The water

not evaporated, transpired, or retained by the soil is the forest's water yield. It includes both surface runoff as streamflow and recharge to groundwater aquifers.

Water quality variables of importance include stream temperature, dissolved oxygen, dissolved ionic components, and suspended and bedload sediment. Stream temperature is controlled by the exposure of the stream to direct solar radiation and the temperature of inflowing tributary or groundwater. Stream temperature may be affected by forest practices which remove shade from streamside areas or alter channel morphology.

The mineral constituents and pH of stream water are controlled by weathering of the parent material and forest soil. Quantities of the important elements, nitrogen and phosphorus, are usually low in forest streams. However, these constituents may increase in response to timber harvest and site preparation which causes an imbalance in the natural nutrient cycles. However, this rarely causes a water quality problem except under the most extreme land management treatments.

Dissolved oxygen is an important constituent of stream water necessary for aquatic life. Dissolved oxygen in forest streams is usually in equilibrium with the concentration of oxygen in the air. Dissolved oxygen saturation is controlled by the water temperature, colder water having the ability to contain higher concentrations, and by the barometric pressure. Dissolved oxygen can be affected by forest practices which affect the stream temperature or result in additions of organic material, such as leaves and twigs, to the stream. Oxygen is used by microorganisms as they decay the woody debris. However, in most steep gradient mountain streams reaeration occurs and reduction in dissolved oxygen is not a significant water quality problem.

The sediment load of streams (both suspended and bedload) is determined by such characteristics of the drainage basin as geology, vegetation, precipitation, topography, and land use. The sediment enters the stream system by erosional processes. To achieve stream stability, an equilibrium must be sustained between sediment entering the stream and sediment transported through the channel. A forest practice that significantly changes sediment load can upset this balance and result in physical and biological changes in the stream system. Sedimentation is, therefore, the most significant water quality problem resulting from forest practice activities.

Sediment routing and storage are particularly important components in the transport process of sediment loads through the stream system. They are critical to the quantification of short and long term impacts of forest practices on stream channels and beneficial uses. However, the storage and routing processes are highly variable and exhibit non-steady state behavior. In some instances, effects from forest practices on aquatic ecosystems through sediment may not be evident for many years.

POTENTIAL IMPACTS ON PROTECTED USES

The Clean Water Act requires the State's to develop Water Quality Standards which meet the intent of the Act in protecting and restoring the nations waters. The policy of the State's Water Quality Standards in accordance with the Clean Water Act states that "In all cases, existing beneficial uses of the waters of the State will be protected" (Section 1-2050.02.c. IDHW 1985). Appropriate beneficial uses have been designated for major stream segments in the State. These uses include agricultural water supply, domestic water supply, cold water biota, warm water biota, salmonid spawning, primary contact recreation (swimming), and secondary contact recreation (wading). Uses which may be potentially impacted by forest practices include cold water biota, salmonid spawning, and domestic water supply. Protection of lakes from eutrophication has been highlighted by the public as an important consideration for forested lands in northern Idaho.

FISHERIES

The term cold water biota as a beneficial use refers both to vertebrate as well as the invertebrate animals which occur in water. For practical purposes, cold water biota generally refers to salmonid species of fish

(trout, salmon, and whitefish) since protection of these species and their food chain will provide protection for other cold water species. Salmonid spawning is identified as a separate use in the Water Quality Standards to provide more restrictive requirements of temperature and dissolved oxygen for the sensitive egg and fry life stage.

Salmonid species of fish are the beneficial use most sensitive to perturbations of the stream ecosystem, and therefore consideration of water quality in forested watersheds generally becomes a question of fisheries habitat protection.

Forest practices have the potential to affect salmonid habitat in a number of ways. The building and maintenance of roads increases the rate of surface erosion and the potential for mass failure which contributes to stream sediment loads. Timber harvest activities may increase surface erosion and may trigger debris avalanches. Operations within the riparian habitat may impact stream cover, channel stability, and reduce shade to streams. The resulting water quality impacts may include increased turbidity, deposited sediment in spawning and rearing habitat, increases in water temperature, and decreases in dissolved oxygen.

Salmonids spawn in stream habitats where deposits of gravel or cobble provide spawning material of the appropriate size. Nests (redds) are built by females by depositing eggs in a hollowed out area and covering the eggs with the stream bottom material. Deposited sediment decreases fry emergence from the redd by inhibiting the flow of water through the spawning material. This reduces the concentrations of oxygen to the incubating eggs and prevents removal of metabolic waste. The fine sediment also creates a physical barrier which traps the fry and prevents emergence.

An equally sensitive life stage is the young fingerlings. Depending on the species, fingerlings utilize the spaces between cobble and boulders to overwinter. Fish swim into these spaces and reduce their metabolism during the cold winter months. Deposited sediment fills the spaces between the rocks which physically reduces or eliminates the habitat available for overwintering.

The qualitative relationship between deposited sediment and salmonid habitat has long been recognized. However, the relationship is not easily quantified. Research is focusing on developing standard methods of measuring deposited sediment and on the relationship between deposited sediment levels (percent fines) and fish fry survival. The effect of deposited sediment on fish density, that is, the total number of fish in an given area, is also being quantified.

Removal of riparian vegetation during timber harvest may increase water temperature in proportion to the amount of increased sunlight which reaches the stream. However, the overstory timber can be removed if an understory of riparian vegetation, such as willow and alders, remains. An increase in stream temperature may cause lethal or sublethal effects on salmonid species which are adapted to cold water streams. In some cases, increasing sunlight to the stream may have a beneficial effect by stimulating an increase in stream productivity.

Salmonids have evolved in cold water streams with naturally high dissolved oxygen levels. Dissolved oxygen concentrations may decrease in streams following timber harvest operations due to the increase in organic material which uses oxygen during decay, and due to increasing temperatures which decrease the amount of oxygen the water may physically hold.

Cold water biota may also be affected by the use of chemicals in forest operations. Herbicides and pesticides are often applied by aerial methods. These chemicals may get into the stream via drift during application or via overland runoff. Herbicides and pesticides may have direct lethal effects or sublethal effects on reproduction and growth.

DOMESTIC WATER SUPPLY

Surface water from forest streams is an important source of domestic water. There are 60 community (town or subdivision) water supplies, 80 noncommunity water supplies, and thousands of individual private homes which draw their drinking water from surface waters, primarily forested watersheds, in north Idaho

(pers. com. Richard Rogers, IDHW 1986). Forest practices may affect domestic water supply by causing excessive turbidity. Highly turbid water increases the cost of filtration and interferes with chemical disinfection. Deposited sediment may fill up the intake reservoir or decrease the flow of water to infiltration galleries. Use of pesticides or herbicides in silvicultural operations may introduce harmful chemicals into the water supply if not properly applied.

Timber harvest may also have a positive effect on a domestic water supply if the community has a need to increase their water supply. Timber harvest can increase the base flow rate in a watershed by decreasing the amount of water lost to transpiration.

LAKE PROTECTION

Lakes are an important feature of Idaho which add to the quality of life and to the economic stability of the State. The public has identified lake protection as a high priority for water quality programs particularly in northern Idaho. Forest practices may affect lake quality in two ways, by the effect on fish production in tributary streams or by contributing to eutrophication. Most salmonid species in lakes run up tributaries to spawn, so the impacts discussed above under fisheries applies equally to lake protection.

Eutrophication is the process of accelerated lake aging caused by an excessive input of nutrients. Algal growth in lakes is limited primarily by the major nutrients, nitrogen and phosphorus. Control of lake quality usually centers on reducing the man-caused sources of these nutrients. In northern Idaho lakes the major sources of nutrients are septic systems from lakeside homes, and nonpoint sources from agricultural and silvicultural lands within the lake watershed.

Streams which drain undisturbed forest watersheds are low in nutrients. Studies have shown that nitrogen and phosphorus may increase in streams following clearcutting and slashburning. Clearcutting stops the uptake of nutrients in vegetation, converts the living nonmerchantable tree tissue to slash, and often increases soil erosion (Fredriksen 1972). Slash burning or broadcast burning results in a nutrient rich ash. Nutrients can be leached from the ash as well as transported in particulate form by surface erosion. Other studies have indicated that nutrient enrichment as a result of harvest operations is not a problem (Sopper 1975; Snyder et al. 1975). Therefore, the relationship between forest management and lake quality does not appear to be well understood at this time. Research is needed in Idaho to determine the level of activity in a forest which is compatible with lake protection.

POTENTIAL SOURCES OF NONPOINT SOURCE POLLUTION FROM FORESTRY OPERATIONS

ROADS

Roads are a primary source of sediment from forested watersheds. Megahan (1972) stated that "roads create a disproportionate share of the problem, probably greater than 90 percent in most instances." The magnitude of sediment contributions from roads will vary greatly, depending on the soil type, geology, topography and climate characterizing the particular site. Roads on gentle to moderate slopes and stable topography have a low potential for contributing sediment when properly constructed and maintained. However, roads located adjacent to streams, on steep slopes, and/or unstable topography have a high potential to produce sediment for a long period of time if not properly planned, constructed, and maintained.

Sources of sediment from forest roads are 1) direct movement of soil during construction and maintenance, 2) surface erosion, and 3) mass erosion. If the road is located so that construction activities cause direct movement of soil into stream channels, then it is likely that future maintenance activities will also contribute sediment, especially if the road encroaches directly upon the stream.

Surface erosion results from raindrop impact on exposed soils and sheet, rill and gully erosion of unprotected cuts and fills and is influenced by rainfall/snowmelt characteristics, soil characteristics, topography, and plant and litter cover (Davis 1976; Swanston 1976). Mass wasting related to roads

includes fill and backslope failures, slumps, earthflows, landslides, mudslides, and rockslides. Surface and mass erosion from roads are related to one or more of the following: removal of protective cover, destruction of soil structure and fertility, increases in slope gradients, decreases in infiltration capacities, interception of subsurface flow, decreases in shear strength, increases in shear stress, and concentration of generated and intercepted surface water (Megahan 1977). Other factors which may influence erosion and sediment include reduced rooting strength and evapotranspiration and alteration of snowmelt hydrology and the surface drainage network (Gray and Megahan 1981).

The reported magnitude of sediment contributions from roads varies greatly. After construction of 1.7 miles of road on a 250-acre watershed in Oregon, the first rain storm produced suspended sediment concentrations about 250 times the concentration in an undisturbed watershed. During the following 2 years concentrations remained about twice as high as normal (Fredriksen 1965). An evaluation of sediment contributions from surface erosion on jammer roads in the Idaho batholith revealed a 1560-fold increase in sediment production during the year following construction, and a 50-fold increase 3 years later. Approximately 30 percent of the total road erosion was due to surface erosion and 70 percent to mass erosion (Megahan and Kidd 1972).

The problem of road erosion is also related to the density of the road network. Careful planning can help minimize the road density. For example, an unplanned road system constructed by the logger at the Fernow Experimental Forest in Colorado occupied 4.8 to 7.0 percent of the area, while a well planned road system on similar topography only occupied 2.5 to 4.6 percent (Mitchell and Trimble 1959). In addition to careful planning, the harvesting system employed largely governs the required road density. Jammer logging may expose 25 to 30 percent of the area as roads while longer cable systems such as a skyline setup may only expose 2 percent of the area (Rice et al. 1972).

Surface erosion is greatly accelerated during and shortly after road construction. Megahan and Kidd (1972) found that about 84 percent of the total sediment production for a 6-year period was produced during the first year after construction. Once the exposed soil revegetates or becomes armoured, surface erosion declines rapidly. Concurrent erosion control during construction with immediate stabilization of exposed soils are needed to minimize surface erosion and sediment contributions.

Mass erosion of roads is usually limited to very steep or unstable slopes. The magnitude of mass erosion does not immediately decrease with time. Megahan (1976) indicates that steep slopes, relatively shallow soil, and rapid, large volumes of water are generally required for mass wasting to occur. However in some situations, prolonged snowmelt and low intensity rainfall events can also contribute to mass wasting. Careful route selection is required to avoid potential problem areas.

Sediment contributions from forest roads can be minimized through proper planning, route selection, design, specifications, construction practices, maintenance and stabilization measures. To achieve the goals for water quality set forth by the Clean Water Act there is a need for much greater attention being given to soil and geologic characteristics, avoidance of high hazard areas, improved engineering surveys, improved road design and improved construction methods (Stone 1973). Proper location of roads relative to streams is also essential. However, a strong preventive approach is not always free of failure, and supplemental corrective measures are also required to minimize sedimentation from roads (U.S. EPA 1975). Megahan (1977) has developed guidelines for reducing erosional impacts of roads in Idaho.

HARVESTING

Methods used for the movement of logs from the stump (point of felling) to a landing (point of concentration) can be classified as one of three major types: tractor, cable and aerial. Animal skidding is a fourth, but minor type. Tractor skidding is accomplished with either crawler or wheel type units, both of which are frequently equipped with auxiliary devices for reducing the extent of contact between log and ground. Cable logging, of which there are many forms, is a yarding system employing winches in a fixed position. Aerial logging, a recent development in the logging industry, is accomplished with heavy-duty and medium-duty helicopters (U.S. EPA 1976). On occasion balloons may be used for aerial logging (Hartson 1978).

Timber harvesting can affect water quality in several ways--suspended sediment concentration, bed load, stream temperature, concentration of dissolved oxygen, and nutrient enrichment (Brown et al. 1976). Timber harvesting can increase sediment in streams by increasing surface erosion rates and increasing the risk of mass soil movement (Davis 1976). Site disturbance can reduce infiltration rates and, hence, the quantity of overland runoff and related surface erosion.

Site disturbance will vary greatly with the type of skidding or yarding system. Crawler tractors generally cause the greatest amount of site disturbance, followed closely by wheeled skidders, but on some sites use of wheeled skidders can result in more compaction than use of crawler tractors (Bell et al. 1974; Davis 1976). One method of decreasing the amount of soil disturbed by crawler tractors or wheeled skidders is through careful layout of skid trails (Rothwell 1971). Planning for skidroad location and number can greatly decrease the impact of tractor logging. Cable logging systems will result in less disturbance to a site, because one end of the log is usually suspended during transport and heavy machinery is restricted to road surfaces. Cable systems can be ranked in order of decreasing soil disturbance as follows: single drum jammer, high-lead cable, skyline, and balloon (Stone 1973; Brown et al. 1976, Davis 1976). Helicopters and balloons will likely result in minimum site disturbance, but both are costly and subject to operational constraints. However, when compared to the costs of conventional logging systems and associated facilities, the cost of aerial logging systems may be competitive, especially when considering the reduced impact of aerial systems on the watershed.

Mass soil movement is generally related to road construction activity, but also can be influenced by tree removal. It is generally thought that decay of tree roots and the resulting reduction in a soil's shear strength contribute to mass soil movement on high hazard sites (Burroughs et al. 1977; Davis 1976). Control of this hazard relates to recognition of the failure potential of an area and regulation of both the yarding system and silvicultural prescription (Brown et al. 1976; Rothwell 1971).

One of the best methods of controlling the entry of sediment into streams is through the use of buffer strips (Bell 1974; Brown 1976). Buffer strips have also been shown to be effective in reducing the entry of logging debris into streams and in controlling stream temperature.

Water temperature is important to water quality since it controls many of the biological processes that affect fish and other aquatic organisms (Brown 1976). Use of buffer strips to control stream shading, and therefore stream temperature, does not preclude controlled harvest within the buffer strips. Temperature control is more a function of canopy density than of timber volume. The optimum width of a buffer strip will vary with width of the stream, topography, and the condition of the streamside stand.

The logging slash produced during a timber harvest operation can degrade water quality through its entry into streams. Large quantities of residue can be generated by clear cutting, particularly of old growth stands (U.S. EPA 1976). Entry of small logging residue into a stream can result in a decrease in dissolved oxygen concentrations in the water, thus affecting fish production (Ponce 1974). Large woody debris has little effect on dissolved oxygen but can affect stream channel stability and cause blockage of streams and drainage structures (Swanson and Lienkaemper 1978). Accumulation of logging debris can increase potential for debris jams and avalanches (Swanston 1976). The best control over this hazard comes through careful layout of logging operations, use of buffer strips, and regulation of the direction of tree falling. The impact of residue entry into streams can be reduced by prompt removal of the material. It must also be recognized that large woody debris is beneficial to streams under natural conditions. Logs and root masses provide stream diversity for fisheries habitat and storage areas for bedload sediment. In some cases introducing large woody debris into streams during timber harvesting will improve fisheries habitat; however, this decision must be made by experienced fishery biologists.

The method of slash treatment or disposal can also affect water quality. Burning residue at a point of water concentration such as a draw could result in increased erosion. Burning can also cause a reduction in soil infiltration rates (Davis 1976). Control of these potential problems parallel those used in the control of slash in general. Windrowing of slash along the toe of fill slopes may aid in controlling erosion and subsequent sedimentation (Cook and King 1983).

The silvicultural system used in harvesting can influence both hydrology and water quality of associated streams. Silvicultural systems include shelterwood, seed tree, clear-cutting, and selection (U.S. EPA 1976). Prescription of a particular system will depend upon existing conditions and management objectives of the site to be harvested.

The hydrologic response to harvesting will vary with the silvicultural system. Removal of forest vegetation is known to increase water yield and streamflows. Various procedures and models have been developed to predict hydrologic consequences (Leaf and Alexander 1975). Clear-cutting can significantly increase water yield (Harr et al. 1975; Cline et al. 1977). Substantial increase in runoff may upset channel stability, associated streams, increasing turbidity and sediment concentrations.

REFORESTATION

Most forest regeneration efforts are directly associated with the harvest of mature timber which involves several thousand acres each year in Idaho. Prompt regeneration of these areas is dependent upon the right combination of physical and biological factors, many of which are profoundly affected by the harvest methods employed. Well planned silvicultural prescriptions help to ensure that the mature timber can be efficiently removed while producing conditions favorable to regeneration of the preferred tree species.

Successful natural or artificial regeneration often requires some site preparation to either prepare an adequate seedbed, reduce slash volumes or remove competing vegetation. Site preparation may include application of herbicides, slash burning, or mechanical scarification. These forest practices may affect the quality of adjacent streams (U.S. EPA 1976).

Mechanical scarification for site preparation is not used to the same extent as is burning in Idaho. Where employed, mechanical scarification is usually confined to gentle topography compatible with the use of crawler tractors. The piling or windrowing of slash for subsequent burning often scarifies the soil surface. Again, this is usually confined to more gentle topography. As the amount of soil disturbance increases on a site, so does the potential for surface erosion and sedimentation. However, since this activity is confined to sites with low slope gradients, it does not pose a threat to water quality when done properly.

Removal of slash by burning may cause accelerated erosion due to destruction of the litter and vegetal cover of the soil surface (Packer and Williams 1974). The degree of accelerated erosion is site specific; however, since burning is done on steep topography, the potential for sediment contributions may be high. Since burning is usually done shortly after harvesting, it is difficult to separate out the effects of burning. However, most studies addressing soil erosion subsequent to harvesting and burning have found that sedimentation rapidly declines as revegetation occurs. In Snyder's et al. (1975) study of clear-cutting and slash burning in northern Idaho, it was found that buffer strips were important in preventing sediment from reaching the streams. Those small ephemeral drainages in the harvest units, not protected by buffer strips, had significantly larger concentrations of suspended sediment.

Most studies have shown an increase in nutrients and chemicals in stream water following slash burning. However, with few exceptions, increases were not of sufficient magnitude to be detrimental to water quality. Snyder et al. (1975) reported increases in bicarbonates, sulfates, calcium and magnesium following clear-cutting and burning adjacent to streams in Idaho provided with buffer strips. Although concentrations decreased with time, they were still higher than pretreatment concentrations two years following burning. No change in nitrates was detected as a result of logging and burning in this study.

CHEMICALS

For some years pesticides (herbicides, insecticides, etc.) and more recently, fertilizers and fire retardants have become acceptable silvicultural tools, with appreciable benefits from the standpoint of forest management. Use of such products may create hazards to water quality which override the positive aspects of their use (Norris and Moore 1976). Pesticides and fertilizers of sufficient concentration may have toxic effects on stream biota and impair downstream uses. Fertilizers may also contribute to eutrophication of lakes and reservoirs.

The fact that silvicultural chemicals are often aerially applied may compound the difficulty of water quality protection. However, at least two features regarding the use of various chemicals in forest management make it unlikely that many specific watercourses will receive permanent or even relatively long term damage. First, in contrast to agricultural usage, these chemicals are applied to only a very small fraction of all our forest land in any one year. Second, also in contrast to agriculture, the same piece of forest land may never receive more than one application of a specific product over a long time span.

To say that serious damage from the use of chemicals is unlikely is not to say that there are no dangers in their use or that precautions should not be taken. Problems can develop if the chemical application is not well planned and executed (Norris 1978).

Experience shows that in many locations water quality is affected by use of chemicals applied to forest land, primarily because of direct application of a particular material to the open water (Moore 1974). Because of the nature of most forest soils and the micro relief of the terrain, little movement into watercourses of chemicals deposited on land surfaces usually occurs. If the chemicals do enter water, resulting concentrations are well below that considered toxic to aquatic life (Meehan et al. 1975) or unacceptable for public water supplies (Moore 1974). Direct application to water occurs if no buffer strips are provided, material is applied when wind conditions were not satisfactory, or because of pilot error in over-running buffer strips.

Difficulties arise in deciding just how small a stream shall require a buffer strip (or if an intermittent stream shall require a buffer strip). If every draw that in some part of the year may carry water requires a buffer strip, this will make it almost impossible to carry out aerial applications of chemicals. Moore recommends that buffer strips be maintained along main streams and larger tributaries (Moore 1974).

As a result of public concern relative to application of herbicides containing dioxin and TCDD a symposium on use of herbicides in forestry was held in 1978 (U.S. Dept. of Ag. 1978). Participants discussed various issues relative to herbicide applications. Subsequent to the symposium the Forest Service issued a revised policy on pesticide use management.

Enforcement of most regulations regarding use of chemicals and fertilizers presents problems. Unless an inspector were on the site during the operation, how would it be known that a spill occurred which was not cleaned up? Who is going to check to see if chemicals are contaminating streams? And by what methods? Because of these complications it is important that the operator be solely responsible for protection of the environment during chemical application. This is accomplished through the licensing requirements of the Idaho Pesticide Rules which are cross referenced in the IFPA.

MONITORING AND RESEARCH NEEDS

The most important environmental issue relating to forest practices in Idaho is the effect of sedimentation on salmonid fisheries. To continue progress on this issue there are a number of information needs that should be addressed. These can be divided into four categories:

1. Quantifying the effect of sediment on fish survival in spawning and rearing habitat for the purpose of developing sediment criteria.

2. Developing a reliable field method for evaluating the impact of stream sedimentation on fish habitat.

3. Improving the predictive tools to determine the effect of a planned forest activity on the quality of salmonid habitat.

4. Compiling land systems information in forested lands which can be used as the basis for developing regional or geographic management practices.

FISH EFFECTS

Recent research has shown that the relationship between fish habitat and sediment can be quantified. Research has focused on the effect of sediment on spawning habitat. Fish eggs are placed in experimental stream channels with varying mixtures of percent fine sediment. Curves have been developed for several trout and salmon species which show the relationship between embryo survival and percentage of fine sediment (Tappel and Bjornn, 1983). The threshold level of sediment that the fish can tolerate could be derived from this type of research. This would give land management and regulatory agencies criteria for sediment, similar to other pollutants, by which progress toward meeting water quality goals can be measured. Research needs to continue on these relationships to establish the validity and reliability of the test procedure and the applicability of the results to the field situation.

Research has also focused on the effect of sediment on salmonid summer rearing and overwintering habitat. Fishery Scientists have measured the degree to which substrate is embedded by fine sediment and related this to the number of fish (fish density) which can occupy the habitat (Klamt 1976, Kelley and Dettman 1980). This work has shown that a dramatic decline in fish numbers occurs after a certain cobble embeddedness is reached. This relationship gives the land management and regulatory agency a potentially valuable tool by which to gauge the effect of forest practices. Work needs to continue on this topic to strengthen these relationships and to determine under which stream conditions these methods are applicable.

MONITORING METHODS

There are a number of methods used to monitor the relation between forest practices, sediment, and fish impacts. Methods that are in use include stream flow, sediment yield, channel geometry, channel structure, channel gradient, stream bank erosion, stream channel stability rating, particle size distribution of spawning gravels by core sampling, cobble embeddedness, fish populations, and inter-gravel permeability. Most of these methods are described in Platts et al, 1983. The selection of methods depends on the objectives of the monitoring program. For assessing the impact of sediment on fisheries, methods which directly measure deposited sediment in fish habitat are preferred.

Standard measurement techniques have not been agreed on by the scientific community. This is an important first step before more progress on the issue can be made. Levinski 1986, compared the various techniques and made recommendations based on assessment of spawning habitat and summer and winter rearing habitat. For evaluation of spawning habitat the use of core sampling appears to have advantages over other methods. This method can produce data of high precision and can be used to determine potential embryo survival. The drawbacks are that this method is time consuming and equipment intensive. Cobble embeddedness shows promise as a technique to evaluate the quality of summer and winter rearing habitat. The advantages of this method are that it is fairly rapid and can be used in remote sites. There is considerable debate regarding how well this method accounts for natural variability within the stream system and within a specific stream reach. These methods need to be further developed and standardized.

In addition to in-stream monitoring methods there is a need to improve techniques used to assess BMP effectiveness upslope from the stream. On-slope monitoring is used to address the selection, implementation, and effectiveness of BMPs at the site of the management activity. On-site reviews and inspections by interdisciplinary teams, sale administrators, woodland foresters, or specialists are the primary means to evaluate BMPs. These reviews can be formal or informal, are generally qualitative, and are conducted routinely. Physical measurements such as hillslope or channel cross sections, sediment traps, surveys of continuous sediment paths and sediment particle tracer movements, and yearly photographs may also be obtained to supplement these project reviews. These reviews and inspections seek answers to: Were the appropriate BMPs selected and included in the project? Were the BMPs implemented in the sediment contributing areas? Are the BMPs technically sound and appropriate? Are there better practices that should be implemented which are technically sound and economically feasible? Were the BMPs applied in total or only partially employed? Were personnel, equipment, funds, or training adequate for BMP implementation? Are the BMPs effectively protecting water quality and beneficial uses?

PREDICTIVE TOOLS

As described in Appendix C federal agencies are required by the National Environmental Policy Act to evaluate the environmental impact of planned forest practice activities. Many of the National Forests in Idaho use some form of two interrelated models developed by the Northern (R1) and Intermountain Regions (R4). The Guide for Predicting Sediment Yields From Forested Watersheds (Cline et al. 1981) estimates the sediment yield in response to various management activites which may include roading, logging, and fire. The second model, The Guide for Predicting Salmonid Response to Sediment Yields in Idaho Batholith Watersheds (Stowell et al. 1983) uses the sediment yield predicted from the first model to predict the potential effect on fish. These two models are used as a tool by the interdisciplinary team to evaluate alternatives on a timber sale environmental assessment and alternatives in draft National Forest plans.

The models need to be modified to fit the different conditions on the National Forests in Idaho. The models were developed for the Idaho Batholith, but can be adapted for other areas. This would require additional research to develop and validate coefficients for geologic erosion, mass erosion, land unit slope, and sediment delivery in the sediment prediction model. Sediment routing, sediment deposition processes, and effects on fishery habitat in the current models are considered a major weakness. Improvements in this area will also require additional research efforts.

LAND SYSTEM INVENTORY

The proposal has often been made that management practices should be based on land capability. There are obvious differences in erosion potential across the state, e.g., the highly erosive, decomposed granite of the Idaho batholith is compared to the resistent soils of the basalt formations. The level of effort and cost required to control erosion is much greater in one geology than in the other. However, translating this concept into a usable system in practice is a complex problem.

The Silvicultural Nonpoint Source Task Force used a simple classification system to group lands by land type hazard based on geology and slope (Table II-1). This provided a basis for making statements regarding the relative risk to water quality based on land types.

Table II-1. Risk Comparison of Land Type Hazard Groups.

	LAND TYPE HAZARD		
SLOPE	GEOLOGIC TYPES		
	I HARD METAMORPHIC, GLACIAL TILL, HARD SEDIMENTS, AND BASALT.	II SOFT METAMORPHIC SOFT SEDIMENTS PYROCLASTICS, AND HARD GRANITICS.	III GLACIAL OUTWASH DECOMPOSED (LOW CLAY CONTENT) GRANITICS.
<45%	L	L	L
45-60%	L	M	M
60-75%	M	M	H
>75%	H	H	H

L = Low, M = Moderate, H = High

Bailey et al. (1978) reviewed various approaches to land and resource classification that have been developed. Examples of classification systems include soil classification and mapping, habitat types, forest cover-type classifications, and ecological regions. Cline (1981) pointed out the importance of survey objectives in land type mapping. Mapping efforts vary by scale and objective. Field procedures for land type mapping used by the Forest Service are not much different than those used in standard soil surveys conducted by the Soil Conservation Service (SCS); however, the approach to map unit design and presentation of map units to the user differ resulting in different maps. Swanston (1981) identified six environmental qualities that could be used to index the watershed in terms of relative hazard from mass soil movement. This includes landform features, soil characteristics, bedrock lithology and structure, vegetative cover, hydrological characteristics of the site, and climate.

System inventories have been completed on many of the National Forest lands. There are some forests that have data reduction work left to do to complete the systems inventory. Mapping is under way in the Panhandle N. F. and should be completed by 1989. Soil surveys in the Panhandle N. F. area have been coordinated with the SCS on mixed ownership lands, so this effort will result in information for state and private lands as well as federal lands. Soil surveys have been completed by SCS in many counties throughout the state. Most of the basic data collection has, therefore, been completed in many forested regions of the state. However, SCS interprets soil data for use as cropland, and therefore much of their published soils information is not usable in mapping hazards on forest land. To identify hazard types from the SCS data will require a concerted effort by soil scientists with forestry experience to make an interpretation of the soil characteristics.

In summary, there is a considerable body of data on federal, state and private land that could be used to develop statewide land capability classification. The classification could then be used as the basis for determining different BMPs depending on soil and geology. However, as pointed out above it will be a major task requiring considerable resources to make this concept a reality.

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III. IMPLEMENTATION ARRANGEMENTS

DESIGNATION OF MANAGEMENT AGENCIES

To accomplish the goals of the water quality management plan it is important to make clear assignment of the responsibilities and authorities of the designated management agencies. Management agencies derive their authority primarily from their enabling legislation and subsequent orders from the executive branch of state or federal government. In addition to these sources, additional responsibilities and authorities are delineated as a part of this management plan which is based on Section 208 of the Clean Water Act. These responsibilites and authorities become binding to the designated management agency through certification of the management plan by the Governor of Idaho and its approval by the Environmental Protection Agency.

Four agencies are specifically identified as designated management agencies - Idaho Department of Health and Welfare-Division of Environment; Idaho Department of Lands; U. S. Department of Agriculture-Forest Service; and the U. S. Department of the Interior - Bureau of Land Management. Other agencies have responsibilities and authorities relating to forest practices but are not specifically identified as management agencies.

IDAHO DEPARTMENT OF HEALTH AND WELFARE, DIVISION OF ENVIRONMENT (IDHW-DOE)

Authority

Environmental Protection and Health Act

The Division of Environment's primary authority for controlling nonpoint source pollution comes from the Environmental Protection and Health Act (EPHA), Idaho Code, Title 39, Chapter 1. The EPHA gives the Director of the Department broad authority to control point and nonpoint source pollution. The following section of the Act provides a summary of this authority:

Section 105 (3). "The director, under the rules, regulations, codes or standards adopted by the board, shall have the general supervision of the promotion and protection of the life, health, mental health and environment of the people of this state. The powers and duties of the director shall include but not be limited to the following:

The supervision and administration of a system to safeguard the quality of the waters of the state, including but not limited to the enforcement of standards relating to the discharge of effluent into the waters of this state and the storage, handling, and transportation of solids, liquids, and gases which may cause or contribute to water pollution."

Enforcement provisions were clarified and penalties for violations increased by amendments made to the Act in 1986. The IDHW-DOE has injunctive authority to "prevent imminent and substantial danger to the public health and environment." (Section 39-108 (8), Idaho Code).

Clean Water Act

The IDHW-DOE is delegated authority under the Clean Water Act for control of nonpoint source pollution. The Governor designated the Division of Environment as the statewide management agency for the Clean Water Act (except for Section 404, permits for dredged or fill material). EPA retains oversight authority for programs delegated to the State.

The IDHW-DOE has authority to coordinate overall monitoring and implementation of management plans developed under Section 208 of the Clean Water Act. Through the State Water Quality Standards the IDHW-DOE also has authority to approve (or disapprove) the IFPA rules and regulations as best management practices.

Under Section 303 of the Clean Water Act the State has the authority to develop water quality standards to insure protection of the beneficial uses of the waters of the state.

Responsibility

The IDHW-DOE has the responsibility to protect the public health and environment as required by EPHA and the Clean Water Act. As a designated management agency, IDHW-DOE has responsibility to coordinate the plan with the land management agencies, evaluate the effectiveness of the plan, and make recommendations for revision of management practices. IDHW-DOE also has specific responsibilities to conduct and coordinate in-stream monitoring to evaluate the effectiveness of BMPs and their implementation by the land management agencies.

Accountability

IDHW-DOE is directly accountable to the Director of Health and Welfare and to the Governor in carrying out the responsibilities of EPHA. IDHW-DOE is accountable to the EPA in meeting delegated responsibilities under the Clean Water Act.

IDAHO DEPARTMENT OF LANDS

Authority

The authority for promoting use of good practices on state and private forest lands is the Idaho Forest Practice Act, Title 38, Chapter 13, Idaho Code. The Act gives the Idaho Board of Land Commissioners the authority to adopt rules and regulations, to make repair orders, and to take enforcement action.

The policy of the Forest Practices Act is to encourage forest practices on state and private lands that maintain and enhance forest resources and their social and economic benefits. In regard to environmental protection the Board has the "authority to adopt rules designed to assure the continuous growing and harvesting of forest tree species and to protect and maintain the forest soil, air, water resources, wildlife, and aquatic habitat." (Section 38.1302 (2), Idaho Code).

IDL has authority under the Idaho Admissions Act, the State Constitution, and State Statutes to manage all resources including forests on state endowment lands. Constitutional policy is to administer these lands to "maximize revenues over time to the endowment funds for the beneficiary institutions." The Land Board has added to this statement so that Department policy now reads " maximize revenues over time to the endowment funds for the beneficiary institutions consistent with sound long-term management practices based on land capability."

Responsibility

IDL has the responsibility under this management plan to apply best management practices on state lands which will provide for protection of beneficial uses of water consistent with the Forest Practices Act. On private lands, IDL has the responsibility to ensure that the Forest Practice Rules are applied to provide for desired levels of stream protection, and to take enforcement action when needed to achieve this goal. IDL has specific responsibilities for reporting, monitoring, and program evaluation and upgrade as part of this plan. An important function of IDL is to identify for adoption by the Board of Land Commissioners revisions of the Forest Practice Rules needed to protect beneficial uses of state waters.

Accountability

IDL is accountable to the State Board of Land Commissioners in carrying out the responsibilities of the Forest Practices Act. As a Designated Management Agency IDL is accountable for meeting the requirements of the Forest Practice Water Quality Management Plan (See Chapter IV, page 39).

UNITED STATES FOREST SERVICE

Authority

The USFS has authority to manage national forest lands within the state. This authority is derived from a number of laws - The Organic Act (1897), Multiple Use Sustained-Yield Act (1960), Wilderness Act (1964), Forest and Rangeland Renewable Resources Planning Act (1974), and the National Forest Management Act (1976). As a Designated Management Agency the USFS has the authority to develop a nonpoint source control program for National Forest lands which will meet the Idaho Water Quality Standards in providing protection of beneficial uses of the waters of the state.

Responsibility

Responsibility of USFS in protecting water quality is addressed by the National Environmental Policy Act (1969), the Clean Water Act, Section 313, and Executive Order 12088 in addition to other laws, executive orders, and Department of Agriculture directives. The USFS has the responsibility under these laws to protect, maintain, and restore beneficial uses of water on lands within their jurisdiction.

As a designated management agency the USFS has the responsibility to implement a system of nonpoint source pollution control on national forest lands. Another important function is to participate in evaluations of the plan, and provide technical expertise to state agencies regarding the interaction of forest activities and water quality.

Accountability

Under federal legislation the Forest Service is accountable to the President and Congress in meeting the requirements of the legislation listed above. The USFS is accountable for meeting the requirements of the Forest Practice Water Quality Management Plan (See Chapter IV, page 40).

BUREAU OF LAND MANAGEMENT

Authority

The BLM has the authority to manage public land in Idaho. This authority is derived from a number of laws including the Federal Land Policy and Management Act of 1976, the Wilderness Act of 1967, the Taylor Grazing Act of 1934, the National Environmental Policy Act, and others. As a designated management agency, the BLM has the authority to develop a non-point source control program for public lands which will meet the Water Quality Standards in providing protection of beneficial uses of the waters of the state.

Responsibility

Responsibility of BLM in protecting water quality is addressed by the Clean Water Act of 1977 (Public Law 95-217, 33 U.S.C. 1251, et seq.), the Safe Drinking Water Act of 1974 (as amended in 1977), applicable Executive Orders (E.O. 12088) and Departmental directives, and Bureau policies and priorities relating to water quality. It is Bureau policy to protect, maintain, restore, and/or enhance the quality of water on public lands so that its utility for other dependent ecosystems, including present and/or desired human environments, will be maintained equal to or above legal water quality criteria. The water quality limits are those defined by the most stringent applicable laws and regulations.

Accountability

Under federal legislation, the BLM is accountable to the President and Congress for meeting the requirements of applicable federal water quality legislation, orders, directives, and policies. BLM is accountable for meeting the requirements of the Forest Practices Water Quality Management Plan (See Chapter IV, page 41).

ENVIRONMENTAL PROTECTION AGENCY

EPA is not a designated management agency in the Forest Practice Water Quality Management Plan, but has an important role in reviewing the success of the program. EPA has authority to review and approve the management plan based on its consistency with Section 208 of the Clean Water Act. After initial approval, EPA must provide an annual review and approval of recertification. EPA has the responsibility to assist the state with development and implementation of the plan including funding from the Clean Water Act.

EPA has other authorities under the Clean Water Act, the National Environmental Policy Act, and the Clean Air Act, Section 319 which are related to forest practice activities. EPA has the authority to review and approve, or disapprove, state water quality standards. EPA is required to promulgate standards if they disapprove state standards. EPA has the authority to comment on NEPA documents developed by the federal land management agencies. EPA is accountable to the President and Congress in fulfilling the goals of the Clean Water Act.

RESPONSIBILITIES OF OTHER AGENCIES

Idaho Fish and Game

Idaho Fish and Game has a major interest in the success of the management plan in reducing the impact of forest practices on resident and anadromous fish. IFG's role in the plan is to function as the State's technical experts on fisheries issues. This includes providing technical advice to IDHW-DOE and IDL, participating in development of water quality criteria, and participating on the statewide Forest Practice Audit Team.

Idaho Department of Water Resources

The Department of Water Resources has responsibility for administration of the Stream Channel Alteration Act. Administration of this Act needs to be closely coordinated with the land management agencies and with IDL in regard to forest practices on private lands. Administration of this law has been seriously limited by lack of field staff in the Department of Water Resources.

University of Idaho, College of Forestry, Wildlife and Range Science

The University provided expertise and analyses which were the basis for the development of the 1979 plan. The University should continue research efforts related to forest practices and water quality. Specific research needs are listed in Chapter II. The University can provide technical expertise in committees regarding monitoring, standards development, the Audit team, Forest Practice Advisory Committee, etc. Participation by the universities is encouraged to provide an unbiased and different perspective on these subjects. The University Cooperative Extension Service should participate in developing education and training efforts to assist the implementing agencies.

Soil Conservation Districts

The Soil Conservation District with technical assistance from SCS helps landowners by preparing woodland conservation plans. It is the responsibility of the Soil Conservation District to insure that these plans are based on approved best management practices. Funding under the forestry incentives program and other cost sharing programs provided by Agricultural Soil Conservation and Stabilization Service should support application of BMPs on forested lands.

STEERING COMMITTEE

Implementation of this revised Forest Practices Water Quality Management Plan will depend on the priority given to it by agency administrators and on future funding levels. An overall steering committee made up

of agency administrators will be established to facilitate plan implementation. The steering committee will review outputs of assigned technical working groups and take appropriate steps within the agencies to implement their recommendations. This procedure will facilitate a realistic implementation process to meet the objectives of the plan.

The steering committee will be comprised as follows:

IDHW-DOE - Administrator (Chairman)
IDL - Director (Also the State Forester)
USFS, Region I - Regional Forester
USFS, Region IV - Regional Forester
BLM - State Director
EPA - Idaho Operations Office Director

Other ad hoc committee members will be appointed by the Chairman to facilitate cooperation and coordination. Ad hoc members may include representatives from the timber industry, conservation groups, universities, and other state and federal agencies.

IMPLEMENTATION NEEDS

The existing situation for implementation of forest practices is shown in Appendix B for state and private lands, and Appendix C for federal lands. The current list of BMPs is shown in Appendix A. Continuing needs for implementing pollution control procedures for forest practices or for resolving concerns relating to implementation was developed based on a review of this information. These needs have been grouped into 11 action items. Also, a separate Summary of Continuing Needs was developed which lists a number of discrete recommendations which can be best addressed within the agencies.

FUNDING

Additional resources are needed to meet the objectives identified in the action items. The IFPA program, within IDL, is the core program which must be funded for the management plan to be successful. The IFPA program has been seriously underfunded since its inception. In addition, the Division of Environment does not have sufficient resources to monitor stream quality and coordinate the management plan. Both agencies need additional resources compared to current budgets to implement the feedback loop concept.

An analysis (Appendix B, page 110) of IFPA program resulted in an estimated minimum budget of $437,000. This is to fund 12 full-time professional positions and supporting equipment. This can be compared to an estimated 7.1 FTEs (1986) of effort which is based on creative use of staff in several programs (See page 100).

In addition to the minimum budget this plan recognizes IDL's need for professional staff in engineering, hydrology, and soils. These positions could provide expertise to both the Bureau of Private Forestry and Bureau of Forest Management. Funding should be pursued for these positions after the minimum budget needs are met.

The Division of Environment currently devotes approximately 1 FTE (1986) of effort on forest practices, primarily for planning, EIS review, and program coordination. A minimum annual budget of $145,000 is needed to monitor stream quality and coordinate the management plan. This would fund four professional positions.

ACTION ITEMS

The following action items were identified.

1. Forest Practice Notification
2. IFPA Inspection Procedures
3. IFPA Enforcement Procedures
4. Training and Education
5. Revision of Best Management Practices
6. Forest Practices Audit Team
7. Internal BMP Implementation Audits/State and Federal Land
8. Monitoring Coordination
9. Cumulative Effects in Mixed Ownership Drainages
10. Water Quality Criteria
11. Plan Evaluation Report

The first three action items - Notification, Inspection, and Enforcement - specifically address administration of the IFPA on state and private lands and do not apply to federal lands. Training and Education (#4) applies to all agencies and identifies the need for increased training of agency and industry personnel as well as general public information and education activities. Action item #5, Best Management Practices, identifies the need for regular review and revision of the IFPA Rules and Regulations.

The next three action items - Forest Practices Audit Team, Internal Auditing, and Monitoring Coordination - are different components of a system to evaluate implementation of BMPs on forested lands and evaluate progress of the management plan in protecting water quality.

Action items #9, Cumulative Effects, and #10, Water Quality Criteria, are relevant issues which need to be resolved in the upcoming years. It should be noted that the need for water quality criteria applies to all nonpoint source activities. However, it is highlighted in this plan because of the importance of an in-stream criteria to forest practice issues. The last action item, Plan Evaluation Report, will provide an annual continuing evaluation of the plan to keep agencies on track toward objectives defined in the action items.

For each action item the goal, existing situation, approach, responsibility, and performance measure is shown. The action items are written in a manner to display clearly the responsibility of the lead agency and to facilitate the annual evaluation of the management plan. The rationale for each action item is presented in the following chapters.

1. FOREST PRACTICE NOTIFICATION/STATE AND PRIVATE LANDS

GOAL/OBJECTIVE

Get all operators to file notifications of forest practices prior to commencing operations as required by IFPA. Notifications should be made two weeks prior to commencing operations so pre-operational visits can be made by forest practice advisors. Notifications will be prioritized for inspection when received based on their potential for damage to water quality.

EXISTING SITUATION

Notifications are often not filed with enough lead time to allow pre-operational visits by IDL personnel. On some operations damaging practices or violations occur in the first few days of work, before contact can be made by Forest Practice Advisors. Conventional techniques may be applied on hazardous sites resulting in forest practice violations. These situations can be avoided by pre-operational visits between the operator and the Forest Practice Advisor.

APPROACH

Increase information and education of operators to demonstrate benefits of pre-operational visits. The Idaho Forest Practices Act should be changed to require notification two weeks (15 days) prior to commencing forest operations if education activities are ineffective.

RESPONSIBILITIES

IDL

PERFORMANCE MEASURES

- Uniform assignment of priority for inspection in all IDL offices.
- An increase in the number of notices filed before operations begin.
- An increase in the percentage of pre-operational inspections performed by the Forest Practice Advisors.
- The IFPA modified to require that the notification be filed 15 days before operations begin.

Note: See page 101 for details of IFPA notification.

2. IFPA INSPECTION PROCEDURES/STATE AND PRIVATE LANDS

GOAL/OBJECTIVE

The goals for the forest practice inspection program is to make field inspections of the majority of high priority areas. High priority refers to high hazard areas, streams with sensitive beneficial uses, and areas where damaging operations have been reported. To achieve this objective more funding will need to be obtained.

EXISTING SITUATION

IDL had no specific Forest Practices Act appropriation until the 1987 legislative session. Since FY-1982, forest practices work has been done as a minor part of the service forestry appropriation. The IDL currently has six Private Forestry Specialists in the field offices. Their working title has been changed (spring 1986) from Woodland Forester to Forest Practice Advisor. They are assigned to perform forest practices work in the amount of approximately 3.2 FTEs. Fire Wardens have also been assigned part-time duties on forest practice inspections. As of July 1, 1987 a $0.05 per acre annual assessment will be made on all private forest lands for the FPA program. Also, $43,600 was authorized annually for the Forest Practices Coordinator.

APPROACH

The approach to increasing the scope of the inspection program is to secure sufficient funding for the program in the long term and to target existing Department resources on the FPA program as an interim measure. A minimum budget of $437,000 is needed to support the program (See Table 2, page 111). This includes 10 full time foresters, the administrative staff, equipment, and a revolving fund. It is estimated that inspection of 710 operations (1,610 field contacts) will cover 75% of high risk sites, 30% of medium risk sites, and 10% of low risk sites (See Table 1, page 109). Inspections will be based on the priority assigned to the site when the notifications are filed. Priority is assigned to the operation based on the Forest Practice Advisors' knowledge of site conditions and beneficial uses of the stream. Other agencies (IDHW, IFG, USFS, Health Districts) and the public will be encouraged to be alert for potentially damaging operations.

RESPONSIBILITIES

The IDL is responsible for inspecting private lands operations and those on state lands.

PERFORMANCE MEASURES

The performance measure is an increase in the number of inspections in high priority areas and a decrease in the number of complaints from agencies and the public. The number of inspections by priority area, and the number of complaints received and follow-up actions taken will be summarized and reported to IDHW as part of the annual plan evaluation report (See Chapter IV, page 40).

3. IFPA ENFORCEMENT PROCEDURES/STATE AND PRIVATE LANDS

GOAL/OBJECTIVE

To take corrective action or repair damages caused by violations of the IFPA rules and regulations; to mitigate and restore damaged soil, water and forest productivity to acceptable levels provided by the laws of Idaho; and to provide an incentive to operators for meeting or exceeding compliance of the FPA rules and regulations.

EXISTING SITUATION

This program is understaffed as discussed under Inspection Procedures, page 27. However, ten years of experience in administering the FPA rules on private lands has shown that on the average about 25% of operations have one or more rules that are rated a minor unsatisfactory compliance. About 1% of the operations are rated as having a serious unsatisfactory compliance. Since there are about 2,500 operations per year, approximately 600 are expected to have one or more unsatisfactory compliances to the 75 individual IFPA rules. Approximately 25 operations (1%) are expected to have a major violation of the Forest Practice Rules.

APPROACH

All unsatisfactory inspections will be followed up until resolved. If the operator refuses to immediately change procedure or agree to a plan to repair the damage, a violation will be issued.

Since 1986, IDL's policy is to issue a notice of violation for all serious unsatisfactory ratings, even with the operator's willingness to change procedure and/or begin mitigative action. This will assure follow-through.

Violations by an operator on state lands are statutory as well as contractural violations and have direct supervision and contract bonding provisions to ensure operator change of procedure or mitigation of damage.

RESPONSIBILITIES

The IDL has the basic responsibility for enforcement of the IFPA. The IDHW has a backup role through the Water Quality Standards where water quality is involved. IFG provides technical support for enforcement actions where fisheries damage occurs.

A cooperative state agency approach has proven to be the most effective enforcement procedure in resolving significant stream damage and will be used where appropriate.

PERFORMANCE MEASURES

The performance measure for enforcement activities will be a summary of a) the number of water quality related Notices of Violation filed, b) the number corrected by the operator, c) the number submitted for legal action, and d) the outcome of legal action including the cost of repairs. The period of time for corrective action will also be tracked and reported. This information will be included in the annual plan evaluation report.

Note: See Appendix B, page 108, for description of enforcement procedures, and Chapter IV, page 40, regarding the annual report.

4. TRAINING AND EDUCATION

GOAL/OBJECTIVE

To train agency staff (IDL, USFS, BLM) involved with forest practices regarding potential impacts to water quality, applicable state and federal law, and state-of-the-art techniques in preventing water quality problems. To provide information to the operators and landowners regarding the IFPA and techniques used to prevent water quality problems. To educate the general public and other agency staff (e.g., IDHW-DOE, IFG) on the intent and procedures of the IFPA.

EXISTING SITUATION

The existing training situation varies among the agencies. IDL staff have a working knowledge of the IFPA. Annual training sessions are held in regard to technical issues. There is an ongoing need for training involving soils, geology, engineering, hydrology, and biology so staff can keep abreast of the latest developments and research findings.

The USFS offers training sessions for their specialists, for example, the annual Soil and Water workshops for hydrologists and soil scientists, and encourages their professional development. National Forests offer training sessions for their timber sale administrators which vary by forest in scope and intensity. Some National Forests are especially known for the quality of training programs for the sale administrators which directly influences the level of water quality protection evident in the field. There is a need for better communication and coordination between peers that work for state and federal management agencies regarding information gained from their experiences. USDA Forest Service research studies, such as those being conducted at Silver Creek (Boise NF), Horse Creek (Nezperce NF), and Tailholt/Circle End (Payette NF) are valuable training areas to educate federal and state agency staff, private operators and landowners, and the general pubic on effects of forest practices on water quality.

The BLM offers a variety of water quality training opportunities from District and state office workshops to formal training sessions.

The current information and education program for landowners, operators, and general public is limited by funding for the IFPA program. IDL personnel have made presentations on the IFPA program to operators, landowners, and civic organizations. Recently, the Department has hired a Forest Practices Coordinator to increase education activities. However, funding for this program is insufficient to reach a significant percentage of the target audience.

APPROACH

Training agency staff should involve a greater degree of exchange of information between various agencies and institutions. This can be accomplished through jointly sponsored technical workshops, university shortcourses, and short-term exchange of personnel and interagency personnel agreements. Within the Forest Service opportunities for increased exchange of ideas exist and should be stimulated by the Regional Foresters and by the Director of the Intermountain Research Station. Using existing processes, Forest Service State and Private Forestry Staff in both Regions can deliver new technology to appropriate users. Intermountain Station watershed research projects should continue to be used for training. An example of an existing opportunity is the on-going training for sale administrators on the Clearwater N. F. This can serve as a model for other forests, and personnel could be exchanged on a temporary basis to develop this program in other national forests. (See Appendix C, page 130).

The approach for informaton and education activities is to increase the scope of the current program in IDL rather than to establish a separate information and education program. The most qualified individuals to promote the IFPA are those people actively involved in the program or in related research and education functions. The FPA Advisors should have primary responsibility for providing education to operators, landowners, and general public on the IFPA program. This will require an increase in the number of staff so that time can be allocated for this activity. (See Appendix B, page 110).

RESPONSIBILITIES

IDL: IDL has primary responsibility to promote information and education activities regarding the IFPA, and the responsibility to provide training for staff.

USFS: National Forests have responsibility to provide training to staff, and to share their technical expertise on forest practices and control procedures to state agency personnel.

BLM: The BLM has the responsibility to provide training on the IFPA or equivalent measures to staff.

IDHW-DOE: The Division can provide assistance to the designated management agencies on training and information and education activities in relation to water quality.

Other Agencies: IFG, EPA, and the Cooperative Extension Service can help provide staff or funding for information and education activities.

PERFORMANCE MEASURES

- Annual (at a minimum) technical training sessions held by the management agencies regarding aspects of the IFPA or BMPs.
- An increase in presentations made to operators and landowners. (IDL)
- An increase in pre-operational consultations with operators. (IDL)

A summary of these activities will be included in the annual plan evaluation report.

5. REVISION OF BEST MANAGEMENT PRACTICES

GOAL/OBJECTIVE

Revise and update the Forest Practice Act Rules and Regulations as needed to protect beneficial uses of State waters. Best management practices should be designed and implemented to maintain and protect beneficial uses.

EXISTING SITUATION

Forest Practice Rules were adopted in 1976. Major revision of the rules were made August 13, 1985 based on the recommendations of the 208 Technical Advisory Committee, Forest Practice Water Quality Management Plan, 1979. Additional needs have been identified (See Appendix A). The Forest Practice Rules specifically apply to state and private lands. Federal practices must meet or exceed these rules.

APPROACH

The method of revising the Forest Practice Rules is prescribed by the Forest Practice Act and the Administrative Procedures Act. Potential modifications to the Rules will be solicited on an annual basis from Bureau of Private Forestry Staff, the Designated Management Agencies, industry, and the public. Potential changes will be submitted to the Forest Practice Act Advisory Committee for consideration. IDL will act on the committee's recommendations according to the Administrative Procedures Act for adoption by the Board of Land Commissioners.

It is important that changes are made to the Forest Practice Rules in a timely manner. An annual process of soliciting input on the rules and submittal for change will assure that BMPs are kept current.

RESPONSIBILITIES

IDL - Lead agency, responsible for soliciting input, scheduling Committee meetings, and adopting recommendations for changes in the rules.

IDHW-DOE - Responsible for evaluating the effectiveness of BMPs in protecting water quality and making recommendations to IDL.

USFS, BLM - Responsible for providing technical expertise to IDL and IDHW regarding effectiveness of BMPs in protecting water quality.

PERFORMANCE MEASURES

- Input from agencies and industry requested annually by IDL.
- Modifications submitted to Forest Practice Act Advisory Committee for consideration on an annual basis.
- Prompt action on the Committee recommendations through the Administrative Procedures Act (i.e., legal notification and public hearings).

Note: See Appendix A for list of BMPs and modification procedure.

6. FOREST PRACTICES AUDIT TEAM

GOAL/OBJECTIVE

Conduct statewide on-site reviews to evaluate if appropriate BMPs are used by the land management agencies and if they are working as planned.

EXISTING SITUATION

An interdisciplinary Technical Review Team conducted on-site reviews in 1978 as part of the original development of the 208 plan. This information was used to make recommendations for revision of the Forest Practice Act, Rules and Regulations. The Silvicultural Nonpoint Source Task Force initiated by the Health and Welfare Board made on-site visits in 1984. Recommendations were made regarding administration of the Forest Practice Act and revision of selected FPA rules.

APPROACH

An interagency, interdisciplinary team is used to conduct on-site reviews of randomly selected forest practices on state, federal, and private lands. The assessment methods are described in Chapter IV, page 42. The steering committee will provide agency support to the audit team and will maintain oversight through review of the audit team's reports.

In addition to the statewide audit, informal, interim, field reviews will be conducted on a localized basis with National forests, IDL Supervisory Areas, and BLM Districts. These field reviews will be conducted annually and will focus on local conditions, problem areas, or specific forest practices.

RESPONSIBILITIES

IDHW-DOE - Lead agency, responsible for initiating and coordinating the audit with the other management agencies.

IDL - participate in the field audits, provide necessary information for selection of state sales and private opeations, and act as liaison with the private landowners.

USFS, BLM - participate in the field audits, provide necessary information for selection of federal sales and provide technical expertise in audit procedures.

IFG - participate in the field audits, provide technical expertise on fisheries impacts.

Other participants: Representatives from industry, public interest groups, and universities, and other state and federal agencies with the desired expertise will be invited to participate as team members or as ad hoc members.

PERFORMANCE MEASURES

- The statewide forest practices Audit should be conducted every four years. This will provide adequate time for the management agencies to act on the team recommendations and allow for detectable changes in the field.
- The final report will be prepared within six months of completion of the field work and will be distributed to the steering committee, Health and Welfare Board, the Land Board, the Governor, EPA, and interested public.
- The interim reviews will be summarized as part of the annual plan evaluation report.

7. INTERNAL BMP IMPLEMENTATION AUDITS/STATE AND FEDERAL LAND

GOAL/OBJECTIVE

Conduct internal reviews of best management practices to determine if they are implemented as planned and to look for on-site indicators of BMP effectiveness.

EXISTING SITUATION

The agencies (USFS, BLM, and IDL) make post-project reviews to evaluate the effectiveness of BMPs. These on-site evaluations have generally been done informally by the sale administrator or others involved in the layout and design of the timber sale. The reviews help the individuals assess the effectiveness of a particular practice or a set of practices. The individuals generally make subjective judgements on how well the BMPs worked and use this information to make more informed judgements on future sales, but rarely document their findings in written reports.

IDL instituted internal audits of forest practices on state lands in 1986. Randomly selected operations are inspected by the Bureau of Private Forestry using at least 3 persons not involved in the forest management program (See Appendix B, page 101).

APPROACH

More on-site evaluations of BMP effectiveness are needed by the land management agencies. These should be structured and coordinated to assure that a representative sample of practices and landforms are being evaluated. To the extent practicable, the on-site evaluations need to be quantitative rather than subjective (e.g., measure ground cover rather than use an adjective rating). Further, the post project evaluation should be documented so that individuals other than those making the review can benefit. It is important that internal BMP evaluations be constructively critical rather than adversarial. They need to be looked upon as a learning experience and a process by which all agencies can expand their knowledge.

All the agencies should use an interdisciplinary approach. IDL and BLM should invite other agency staff to participate if soils, hydrology, biology and engineering staff are not available internally. Credibility of internal audits will be increased if outside agency staff (IDHW, IFG) are a part of the audit team.

The research being conducted by the Forest Service's Intermountain Research Station at Silver Creek, Horse Creek, and Tailholt/Circle End is recognized as a critical link in quantifying BMP effectiveness. These projects are closely controlled and provide quantitative results of onsite soil movement and sediment delivery to the channel system resulting from a variety of alternative BMPs.

RESPONSIBILITIES

Forest Service, BLM, and IDL will annually examine a representative sample (target 10%) of timber-related projects and prepare written BMP evaluation reports. (The 10% target is intended to include significant land-disturbing activities. It is not intended to include small sales with little soil disturbance, such as the numerous small firewood sales in some regions which have little environmental impact.) To the extent possible, findings from these evaluations are to be shared internally and with other agencies.

PERFORMANCE MEASURES

- IDL: Results of internal audits on state lands will be summarized and forwarded to IDHW-DOE .
- USFS: National Forests will initiate (or continue) post project audits by an interdisciplinary team. The results of these audits will be collated and summarized by the two regional offices and forwarded to IDHW-DOE.
- BLM: BLM will initiate internal audits and forward the information to IDHW-DOE.
- IDHW-DOE: Collate and summarize reports from management agencies for inclusion in the plan evaluation report.
- Period: Annual.

8. MONITORING COORDINATION

GOAL/OBJECTIVE

Develop a coordinated in-stream monitoring strategy to evaluate implementation and performance of forest practices in protecting water quality and beneficial uses. The primary objective is to standardize in-stream monitoring techniques. A secondary objective is to encourage cooperative monitoring programs within the same drainage by various management agencies.

EXISTING SITUATION

There has been little agreement between specialists in developing standard methodology for evaluating the effects of forest practices. With the recent efforts in developing National Forest Management Plans the need for standardized monitoring techniques has been recognized and is beginning to be addressed. Coordination between state and federal agencies has been limited to isolated monitoring projects.

There is currently very little data available on which to judge the current status of streams in forested areas. Virtually no data has been collected in state and private ownerships. The National Forests and BLM have collected data on sediment and habitat characteristics; however, various techniques have been used. Overall, the quality and quantity of information is minimal.

APPROACH

A technical working team will be initiated to develop standard monitoring techniques regarding the effects of forest practices. The team will initially address the more basic questions of monitoring objectives, monitoring location criteria, and minimum standards for data quality. The technical working group will be comprised of specialists with monitoring expertise regarding forest practices - water quality specialists, hydrologists, fishery biologists.

The technical monitoring team will report their findings and recommendations to the management steering committee. The steering committee will evaluate these recommendations and take necessary steps to follow through on the recommendations.

RESPONSIBILITIES

IDHW-DOE - Lead Agency, responsible for initiating the steering committee and technical working team and coordinating the product.

IDL - Representation on the steering committee for state and private lands.

USFS - Participate on the steering committee, provide staff specialists for the technical working group.

BLM - Participate on the steering committee, provide staff specialists for the technical working group.

IFG - Provide staff specialists for the technical working group.

PERFORMANCE MEASURES

- Technical Working Group established within 6 months of completion of this plan.
- Meetings held annually at a minimum.
- BLM, USFS: Forest or District monitoring plans completed and updated annually.
- A monitoring strategy should be developed for state and private lands by IDHW-DOE and IDL within one year of completion of this plan.

9. CUMULATIVE EFFECTS IN MIXED OWNERSHIP DRAINAGES

GOAL/OBJECTIVE

Develop a process to keep cumulative impacts on water quality and beneficial uses within acceptable limits. The initial step in this process is to develop a forum for exchanging information between landowners with mixed ownership watersheds regarding proposed forest activities.

EXISTING SITUATION

From scientific literature, newspaper articles, the 1979 Forest Practice Water Quality Management Plan, the 1985 Silvicultural Nonpoint Source Task Force Report, comments on Forest Service Plans, and other sources, cumulative watershed impacts have been recognized as a concern in Idaho. Idaho needs to develop a process to address cumulative watershed impacts from mixed ownerships.

APPROACH

A cooperative information sharing program on cumulative watershed impacts will be formulated, developed, and established by an interagency, interdisciplinary task force. This task force will be composed of representatives from IDL, IDHW-DOE, timber industry, and federal land management agencies. The types of shared information, its format and presentation, the time frames to be considered, watershed sizes to be evaluated, managerial constraints and considerations, and other details will be defined by the team. The task force will consider methods for controlling cumulative wateshed impacts.

RESPONSIBILITIES

IDL - Lead agency, will provide leadership for development of the Cumulative Watershed Effects Cooperative. They will serve as a clearinghouse for the shared information, insure comparability of shared information, and take the leadership role in evaluation of the information.

IDHW-DOE - will assist IDL in cumulative watershed effects evaluation by determining instream values, establishing instream criteria to protect beneficial uses, monitoring, and providing recommendations.

IFG - will provide information on fisheries populations in identified watersheds.

The timber industry, Forest Service, BLM, and other federal agencies will provide support for the cooperative, conduct monitoring, and help evaluate shared information.

PERFORMANCE MEASURES

The task force will be established within 6 months of finalization of this document. The recommended process to address cumulative watershed impacts through a cooperative information sharing program will be developed 1 year after task force formation. The process will be implemented in a trial basis for 1 year in northern Idaho. After the 1 year, the process will be reevaluated and fine tuned prior to statewide application.

10. WATER QUALITY CRITERIA

GOAL/OBJECTIVE

Develop water quality criteria for sediment generated from forest practice activities.

EXISTING SITUATION

The Idaho Water Quality Standards and Wastewater Treatment Requirements do not include a quantitative criteria for sediment. Policy and narrative standards were revised in 1980 which stated that nonpoint sources should not seriously injure a beneficial use of water. Additional changes to the standards were proposed in November, 1986 based on the recommendations of an interagency group. The lack of a criteria for sediment is a major stumbling block for gauging the effectiveness of this management plan in protecting beneficial uses.

APPROACH

Governor John Evans directed the establishment of a nonpoint source interagency team including representatives from IDHW-DOE and IDL in April, 1986 to address the forest industry's objections to the language of the Water Quality Standards. In addition to suggesting specific changes to the standards, the interagency team identified actions which need to be addressed to implement the standards. The following actions are modified from the team's list of needs. The interagency team noted that additional funding would be needed to carry out these activities and identified a completion date of July, 1988.

1. Seek funding for criteria development.

2. Compile information on potential criteria and determine deficiencies.

3. Compile available literature on the effects of sediment. (*Note: A literature review has been completed under contract to EPA - Development of Criteria for Sediment in the Northern Rockies Ecoregion by D.W. Chapman and K.P. McLeod, 1987:*

   The authors concluded that existing quantitative relationships between fish and sediment were insufficient for development of criteria and recommended research projects to improve the functional relationships.)

4. Develop criteria if warranted by the literature review.

5. Evaluate the feasibility of using criteria for forest practice activities.

RESPONSIBILITIES

IDHW-DOE - Lead agency.
EPA - Technical support.
IDL, USFS, BLM - support and review responsibility.
IFG - technical support.
Ad hoc team members should include representatives from industry, public interest groups, and other state and federal agencies. The team should encompass a broad range of disciplines to address the linkage between onsite impacts and instream effects.

PERFORMANCE MEASURES

Steps identified under Approach taken in a timely manner, with the IDHW-DOE recommendation for a sediment criteria made by July, 1988, if feasible.

11. PLAN EVALUATION REPORT

GOAL/OBJECTIVE

Evaluate the overall progress on the Forest Practice Water Quality Managment Plan and report the findings to participating agencies, EPA, the Governor, and the public.

EXISTING SITUATION

Annual reports on the status and success of the management plan adopted in 1979 have not been completed. The Silvicultural Nonpoint Source Task Force (1985) report met some of this requirement, but was only a one-time effort.

APPROACH

Summarize the evaluation of performance measures of the designated management agencies (including IDHW-DOE) in meeting their goals and objectives as identified in this section, and make recommendations for any nessessary improvement. (See Chapter IV, page 44.)

RESPONSIBILITY

Steering Committee

PERFORMANCE MEASURES

Frequency: Annual
Report: Report distributed to participating agencies, the Governor, and EPA.

SUMMARY OF CONTINUING NEEDS

IFPA PROGRAM

1. A cooperative agreement between IDL and the Idaho Department of Water Resources should be developed regarding stream alterations associated with forest practices (See page 103).

2. The IFPA should be changed to apply the Rules and Regulations to land conversion until such conversion is completed.

3. Amend the IFPA to recognize the land owner's liability in complying with the Act (See page 116).

4. Clarify the IFPA to require a reasonable minimum prior notification period (15 days) (See page 116).

5. A revolving account for use in making repairs by IDL needs to be established. Currently IDL may not be able to make repairs in a timely manner due to a lack of funds (See page 108).

6. Consideration should be given to amending the IFPA to require licensing and/or bonding of operators to increase compliance with the Act (See page 108 and 116).

7. Efforts should be made to secure funding for professional engineering, hydrology, and soils assistance for both private forestry and Forest Management Programs (See page 110).

8. A procedure should be developed to facilitate review of proposed state timber sales (See page 115).

RESEARCH NEEDS

1. Quantify the effect of sediment on fish survival in spawning and rearing habitat (See page 13).

2. Develop a reliable field method for evaluating the impact of stream sedimentation on fish habitat.

3. Improve the predictive tools to determine the effect of a planned forest activity on the quality of salmonid habitat.

4. Compile land systems information in forested lands which can be used as the basis for developing regional or geographic management practices.

5. Investigate the relationship between forest management and lake quality (See page 9).

IV. PROGRAM EVALUATION AND UPGRADING

INTRODUCTION

For the Forest Practices Water Quality Management plan to be effective it is important to include methods for monitoring progress toward achieving goals and taking corrective action. Program evaluation involves a variety of activities - internal BMP auditing, on-site and in-stream monitoring, independent forest practice audits, and compilation of this information into an overall report. Program upgrade is an on-going process - monitoring, evaluation, recommendations on changes to programs - and then a repetition of these steps to determine if corrective action was effective.

This continuing planning process will require a high degree of cooperation and coordination within and between agencies to be successful. Ultimately, these steps involve all personnel in the designated management agencies to some degree. The responsibility for overall coordination and management belongs to the steering committee described in Chapter III, i.e., the administrators of the designated management agencies. Administrators will need to delegate tasks to staff; however, they will need to assure that their agency responsibilities identified in the plan are met.

This chapter of the management plan outlines the components of program evaluation and upgrading which are needed to maintain certification of the plan by the Governor and approval by EPA. These components consist of:

1. Accountability of the designated management agencies.

2. Organization of the Forest Practices Audit Team to systematically review practices throughout the state. This constitutes an independent or external appraisal of the land management agencies' performance in protecting water quality.

3. Description of a process to coordinate in-stream monitoring of forest practice activities and development of applicable water quality criteria.

4. Development of an annual report which provides an overall evaluation of progress on the management plan.

ACCOUNTABILITY OF DESIGNATED MANAGEMENT AGENCIES

Designated management agencies are responsible for measuring and reporting their compliance with the Forest Practices Water Quality Management Plan. The land management agencies will perform internal audits which will be combined with results of the Forest Practices Audit Team and results of in-stream monitoring to gauge the success of the management plan. This information is analogous to the requirement for point source dischargers to monitor effluent quality and report the results to the pollution control agency.

IDAHO DEPARTMENT OF LANDS - STATE FOREST LANDS

Internal audits of state forest lands was initiated in 1986 by the Director. The internal audits are performed by the Bureau of Private Forestry using standard FPA inspection forms. The audits are used to determine compliance with the IFPA and to determine if changes are needed in procedures used in the Bureau of Forest Management.

As part of its responsibility identified in this management plan, IDL will provide a summary of the audits to IDHW-DOE, including problems found and corrective action taken.

IDAHO DEPARTMENT OF LANDS-PRIVATE LANDS

IDL is responsible for insuring the application of BMPs on privately-owned forest land in Idaho. The effectiveness of the IFPA Rules as BMPs and their administration will be accomplished through documentation by IDL Supervisory Areas as shown below. This informaton will be used internally to measure progress on the FPA program, and will be reported to the Steering Committee and IDHW for inclusion in the annual plan evaluation report.

Notification

1. Report the number of forest practices notifications and the type of practice indicated. Include assigned hazard priority, where possible, including those operations near Class I and II streams.

2. Review and report the number of variances from the IFPA Rules, the purpose, and the outcome.

3. On state-owned lands determine and report the number of timber sale contracts or other practices: report the acreage treated, number involving Class I or Class II streams, and miles of road built.

Compliance Inspections

1. Report the number of on-site inspections with categories in low, medium, and high hazards, and the number of inspections before, during, and after operations.

2. Report the number of complaints received regarding water quality and follow-up actions.

3. Report any problems with administration or effectiveness of specific IFPA Rules and recommend necessary modifications.

Enforcement Action

1. Report the number and type of violations issued for water quality related rules; cite specific rules where possible.

2. Report the number of water quality related Notices of Violation: a) corrected by operators, b) submitted for prosecution or legal action, and c) report outcomes, including the cost of repairs.

Change in Statute or Regulation

1. Report the changes or attempts to change the IFPA or Rules and Regulations and the results of these efforts.

2. Report the status and activities of the Forest Practices Advisory Committee and their results.

Staff Level

1. Report on the efforts to secure funding for the IFPA program.

2. Report on the staff effort devoted to the IFPA program for the past year. Include the number of FTEs for the Forest Practice Advisors as well as other staff.

NATIONAL FOREST LANDS

The Forest Service will evaluate BMP implementation, administration, and effectiveness, and determine water quality effects of forest practices on National Forest lands. This will be accomplished through internal

implementation audits, on-site and in-stream monitoring, and research programs. Reporting from the National Forests will be standardized and coordinated through the two regional offices that include Idaho.

The Forest Service will:

1. Provide an annual report on the water quality monitoring and evaluation efforts as described in Forest Plans. Disclose the monitoring results, management implications of this monitoring, any adjustments to management activities as a result of monitoring, and monitoring and evaluation efforts for the upcoming year.

2. Provide an annual list and description of the water quality related research efforts on National Forest System lands.

3. Provide any evaluations of the cost effectiveness and mitigation efficiency of new or old BMPs that are employed on National Forest System lands.

4. Report problems and concerns with BMPs that are prescribed by the IFPA Rules relating to water quality and provide recommended improvements.

BUREAU OF LAND MANAGEMENT

The BLM will evaluate BMP implementation, administration, and effectiveness, and determine water quality effects of forest practices on forest lands administered by BLM. This will be accomplished through internal implementation audits and on-site and in-stream monitoring. Reporting from District offices will be coordinated through the state office.

The BLM will:

1. Provide an annual report on the water quality monitoring and evaluation efforts. Disclose the monitoring results, management implications of this monitoring, any adjustments to management activities as a result of monitoring, and monitoring and evaluation efforts for the upcoming year.

2. Provide any evaluations of the cost effectiveness and mitigation efficiency of new or old BMPs that are employed.

3. Report problems and concerns with BMPs that are prescribed by the IFPA Rules relating to water quality and provide recommended improvements.

IDAHO DEPARTMENT OF HEALTH AND WELFARE-DIVISION OF ENVIRONMENT

Idaho Department of Health and Welfare has overall responsibility for coordination of the management plan and evaluation of progress. This responsibility is met through initiating activity on action items listed in Chapter III. This includes:

1. Initiating annual review of the management plan through meetings of the interagency steering committee, and summarizing results in an annual report.

2. Initiating and participating on technical committees for coordinated monitoring and cumulative effects in mixed ownership.

3. Initiating and chairing the Forest Practices Audit Team.

4. Initiating development of water quality criteria for sediment.

5. Coordinate activities with USFS at the National Forest level. This includes annual coordination meetings, cooperative in-stream monitoring, participation in field reviews, and review and comments on NEPA documents.

6. Coordinate activities with Bureau of Land Management.

7. Coordinate field activities with IDL at the Supervisory Area level. This includes annual review of the state timber sales plan, participation in field reviews, coordination with FPA program on site inspections, monitoring, and enforcement on private timber lands.

8. Initiate in-stream monitoring programs, as resources allow, in mixed ownership drainages.

FOREST PRACTICES AUDIT TEAM

OBJECTIVE

The purpose of the Audit Team is to provide an independent evaluation of the silvicultural control programs and make recommendations for any necessary upgrade. The Audit Team can provide only a portion of the information needed to evaluate the overall program effectiveness. Research into the effectiveness of management practices (such as rainulator experiments for specific treatments) and evaluations of in-stream monitoring are the other information components needed to upgrade the program.

The Audit Team can determine if management agencies are using the prescribed BMPs and if these practices are providing reasonable control of surface erosion and mass failure. The Audit Team can also evaluate the language of the IFPA Rules and Regulations and make recommendations for improvement. However, the connection between evaluation of the management practices and determining the effect on fisheries is much more difficult and can not be done adequately without a linkage to in-stream measurements.

APROACH

An interdisciplinary team is used to conduct on-site evaluations of randomly selected forest practices on federal, state, and private lands. The field audits should be conducted every four years. This will provide adequate time for the management agencies to act on the team recommendations and allow for detectable changes to occur in the field as a result of the recommendations. The field audits are time consuming and expensive; a more frequent interval will require additional funding. Interim annual audits will be conducted on a local basis with National Forests, IDL Supervisory Areas, and BLM District offices. These interim field audits may be more informal and may focus on problems identified by the staff in the local area.

Since the evaluations are based on best professional judgement, the team members should have lengthy field experience in forest practices. The team should include specialists in forest hydrology, salmonid fisheries, silviculture, forest road engineering, soil science or geology, and water quality. The team members may be selected from IDL, USFS, BLM, IFG, universities, forest industry, or other state and federal agencies. Every effort should be made to prevent potential conflicts for the team member between agency loyalty and professional judgement.

The steering committe described in Chapter III will provide oversight and coordination between agencies. In addition to the designated management agencies ad hoc members should include representatives for EPA, private industry, and concerned public interest groups. The steering committee may also have representatives from the Water Quality Policy Advisory Committee and the IFPA Advisory Committee to facilitate transfer of information. The steering committee will review the Audit Team's plan of work, provide any assistance within the agencies regarding candidate sites and logistics, provide comments on the team's progress and procedures, review the team's report and facilitate getting the team's recommendations into action.

SITE SELECTION

The selection of sites will depend on the objectives defined by the Audit Team members. For example, the Audit Team and steering committee may decide to address the effect of forest practices only in high hazard land types. Sites should then be selected randomly from a list of candidate sites which meet the Audit Team's criteria.

The sample design used by the Silvicultural Nonpoint Source Task Force in 1985 is summarized below. Consideration was given to land ownership, geographic location, geologic land type, type of forest practice, and logging method. The Task Force decided on the following criteria:

1. Minimum size: The unit will include a minimum size of 10 acres treated.

2. Proximity to streams: A class I stream is within or adjacent to the unit. Adjacent means within 100 feet of the cutting unit boundary. There should be at least 500 linear feet of Class I stream in the unit.

3. A road building or timber harvest activity occurred in the unit within the last year.

4. The total sample is to include a minimum of 25 to 35 percent of the units within granitic land types.

In practice the team discovered that it was not possible to meet all of these criteria based on a prior selection of sites. A totally random selection was not feasible. The USFS supplied an overall list of candidate sites that met the criteria, however, such a list on state and private lands was not possible. In practice, USFS sites were randomly selected, then nearby state and private sites were selected that were within a practical travel route and which appeared to meet the criteria. A completely random selection would have resulted in much wasted travel time. Even with a planned itinerary it took 20 days to visit 25 sites.

ON-SITE EVALUATION PROCEDURE

The basis for the on-site reviews is the subjective evaluation of compliance with the IFPA Rules and Regulations and observation of stream impacts. The field form used by the Silvicultural NPS Task Force is shown in Appendix D. Each applicable rule was rated in the field for both compliance with the rules and water quality impact using a rating system from one to five, with one being a low rating and five being a superior rating (See page 2 of form, Appendix D).

Once at a site the Audit Team should meet with a representative of the land management agency or landowner to get an overview of the operation. On USFS sites the Timber Sale Administrator should be present, and a copy of the sale map and Environmental Assessment made available to the team. On state lands the Forester in charge of the contract should be present and have a copy of the sale map and contract requirements. The Audit Team should concentrate their examination on areas where erosion hazards are high and where sediment can be delivered to streams. This includes walking skid trails near draws or channels, walking the major streams within the sale boundary, examining stream crossings, and observing road construction and maintenance practices. Notes should be made of the type of geology, soil type, and the logging method. Streams should be examined for observable impacts to bank integrity, direct sediment delivery, and obvious cobble embeddedness.

Although the Audit Team inspections provide valuable information, the limitations of the procedure need to be remembered. Forest practice operations normally cover several seasons between the time the road access is built and site preparation is completed. A one day inspection can not adequately assess all the potential sources of sediment which may occur throughout the operation. The relation between significant storm events and the site visits can not be planned. Most surface erosion generally occurs either during the operation or within the year following the activity. Mass failure of slopes or roads, however, may not occur until many years (three to ten) after the operation. Timing of the site visit, therefore, in relation to assessing water quality impacts is not straight forward. The visual assessment of in-stream sediment impacts is extremely crude and can only detect gross differences in sediment

deposition. A major limitation in this approach is that cumulative impacts (or the hazard of) on the stream cannot be detected by a random site inspection. This is an important limitation which must be considered when the information from the Audit Team is used.

COORDINATED MONITORING

The idea of coordinating monitoring programs for forest practices between the various agencies is a concept which is very attractive but at the same time is recognized as very difficult to get into action. The emphasis is on coordination of monitoring activities, not on creating new or additional monitoring programs.

National Forests collect in-stream data to meet their management objectives, standards, and guidelines which are displayed in the National Forest management plans. National Forests in Idaho are all involved in monitoring of substrate quality to some degree. Virtually no monitoring is being done on streams on state and private lands. (BLM conducts some monitoring in mixed ownership drainages.) The Division of Environment has the responsibility to do monitoring, but has not had the resources to establish a monitoring program for forest practices to date.

As outlined in Chapter II the suggested approach to developing a coordinated monitoring program is to establish a technical working team. The technical team will be comprised of specialists with monitoring expertise in forest practices which include water quality analysts, hydrologists, and fishery biologists. The technical team will review the existing and proposed monitoring programs and make recommendations regarding assessment methods, intensity, quality assurance, reporting, etc. The steering committee will review the recommendations of the technical team and take appropriate steps to address these recommendations in agency programs, budgeting, and staffing.

Division of Environment has the responsibility for initiating the steering committee and technical team.

OVERALL PLAN EVALUATION AND PROGRAM UPGRADE

Overall evaluation of the management plan and recommendations for program upgrade will be accomplished through annual meetings of the steering committee and preparation of an annual report. Since IDHW-DOE has overall responsibility for coordination of the management plan the meetings will be chaired by the Administrator of IDHW-DOE or his designee. The basis for the annual meeting is review of progress on action items during the preceding year. Annual reports from the designated management agencies will be provided to the steering committee prior to their annual meeting.

Agenda items will include:

1. Review of progress on action items which are based on technical teams or interagency coordination. Depending on the stage of the project the steering committee will make staff assignments for committees, review committee plans and schedules, review results, or report on agency implementation of committee recommendations. This includes the Forest Practices Audit Team, coordinated in-stream monitoring, cumulative efffects in mixed ownership lands, and water quality criteria development.

2. Review of performance measures and accountability requirements listed in Chapter III and the section on accountability in this chapter (page 39-42) . For example, this would include results of internal BMP audits, in-stream monitoring, research efforts, and notification, inspection, and enforcement actions for the IFPA.

IDHW-DOE will collate the reports from the designated management agencies and technical teams, summarize progress toward management plan objectives, and recommendations for action made by the steering commmittee into an overall progress report. The annual report will be sent to the Governor, EPA, designated management agencies, and interested public.